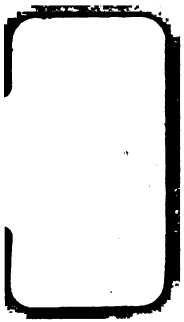

SHOOTING FOR BOYS

ELIPHALET REMINGTON

The Boy Gun Maker

SHOOTING FOR BOYS

BY

A. FREDERICK COLLINS

Author of

"Manual of Wireless Telegraphy and Telephony," "Design and Construction of Induction Coils," "The Book of Stars," etc.

NEW YORK

MOFFAT, YARD AND COMPANY

1917

Published April, 1917

TO MY SON

VIRGIL DEWEY COLLINS

WHO COLLABORATED WITH ME

IN WRITING THIS BOOK

PREFACE

A WORD TO THE BOY

YOU ought to be a shooter, for shooting is the greatest sport in the world.

By this I do not mean that you should hunt dumb and harmless things with a rifle or a shotgun, for this is a far cry from true sport, and no shooter with a drop of sportsman's blood in his veins would do it.

But to be able to draw a bead on the bullseye of a swinging target at, say, twenty-five yards and hit it nine times out of ten, or to stand on a firing-line where clay pigeons are thrown by a trap at a speed twice as swift as real pigeons fly and to break them one after another, is what I call a *sportsman's sport* in every sense of the word.

There is much more in shooting though than just the pleasure and the pride you get out of it by being an expert marksman, for it trains your eye to see quickly, to observe sharply, and to gauge distances accurately; besides, it gives your

trigger finger a deftness of touch that is little short of marvelous and makes it work in perfect harmony with your eye.

This is done through two sets of nerves in your body, which are called the *afferent* and the *efferent* nerves. Now, the afferent nerves carry the actions of everything your eye sees and your fingers feel to your brain, while the efferent nerves carry the ideas that are developed in your brain to your eye and fingers just as a telephone wire carries messages along it to and away from a central station.

When you shoot there is an instantaneous connection made between your brain and your eye and between your brain and your trigger finger. First, your brain tells your eye to spot the target you want to shoot at, and the instant your eye has done so it flashes back the answer; simultaneously, your brain sends another message to your index finger to pull the trigger, and this it does.

If these subconscious desires of your brain are not sent, carried and received instantly, then your eye and finger are not properly adjusted for quick action, and of course you will miss the target. To hit what you are shooting at means that your eye and brain and finger work together with an extraordinary degree of precision and rapidity, and it is this kind of mental and manual practice

which target-shooting gives you as can nothing else that I know of in the whole category of exercise or sport.

To shoot not only drives your sportsman's blood through your veins like an onrushing torrent and thereby produces the pleasantest feeling imaginable, but what is more worth while it gives you a cool, calculating nerve and a quick and certain *draw* which brings out the best that is in you as well as makes you a dead shot like unto Daniel Boone and Buffalo Bill.

If you will learn to shoot according to the rules I have laid down in this book, you will be so prepared that should you ever be called upon to protect your life, your home or your flag you will be able to give a pretty good account of yourself.

A. FREDERICK COLLINS.

The Antlers, Congers, New York.

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SHOOTING FOR BOYS

SHOOTING FOR BOYS

CHAPTER I

HOW SHOOTING BEGAN

IT all started when the *boy-ape* was being developed into the *ape-boy* away back there in the making of the third crust of the earth, or *Tertiary epoch* as it is called by *geologists,* and that was nearly a million years ago.

About the middle of that dim and distant age the boy-ape was a tailless, narrow-nosed fellow who had tremendously long and powerful arms and by means of them he could swing himself from tree to tree with the agility for which his kind has ever since been famous and at a speed almost as fast as you, or I, can run.

The Throwing of a Missile.—But he was showing signs of being clever, was this boy-ape, in other ways than swinging in trees, and one of them was that he could *throw* a little, for he had learned how to grasp a stone or a stick, impart the energy of his muscles to it and hurl it with a good deal of force toward the object of his wrath.

Mere brutish strength, though, was not enough to enable the boy-ape to throw a missile either hard or straight, for the nerves of his eyes and the

Fig. 1—The Boy-Ape Throws a Stone.

muscles of his arm and hand lacked *co-ordination,* that is, he hadn't practiced enough to get the knack of making them work together smoothly.

These crude efforts of his at throwing were not

wasted however, for when he had *evolved* into the ape-boy during the latter part of the Tertiary Age, and *environment* had shortened his arms and made them more nearly the length of the boy of today the old *hereditary* trait of throwing stood him in good stead and as he emerged from the forest and lived in a cave his sole means of protection and probably of obtaining food depended very largely on his ability to throw hard, throw straight, and to hit what he aimed at.

This, then, was the very beginning of what we call *shooting,* and as the ape-boy became a *real-boy*—that is, a boy who could talk and think and do things—he was ready for an age of discovery and of invention.

The Discovery of the Boomerang.—Like nearly all discoveries made by the early real boy the discovery of the *boomerang* was purely an accident, but unlike the ape-boy who lived before him he had the mental ability to improve upon any new thing that chanced his way.

As an illustration, one day he picked up a small bent stick a couple of feet long; it was a curiously shapen stick, nearly flat and with a smooth end and he thought it would make a good throwing-stick for hunting.

The first time he threw it a mighty strange thing

happened for it missed the bird and describing a beautiful curve he saw it returning toward him; frightened he ran back of a tree and a second later it struck him on the head and he promptly keeled over. Either the stick had become alive or else an evil spirit was guiding it and it was a long time before he was brave enough to throw it again.

Sometimes it would go the way of all sticks but once in a while it would make a return swoop. He experimented and finally found that what was needed to make it return was to hold it a certain way and give it a peculiar twist as it left his hand and when he did this the stick would loop back if it did not strike the mark he aimed at. And thus it was that the boomerang came to be.

This strange and uncanny stick is still in use among the *aborigines* of Australia as a weapon of offense and defense and these savages have attained a very high degree of skill in throwing it.

How to Make a Simple Boomerang.—Just to show the principle of the boomerang you can make a toy one and see for yourself how it acts. Cut a boomerang out of heavy cardboard about 6 inches long and make it the exact shape shown at *A* in Fig. 2.

To project it into the air lay a book upon a

table and slip a piece of wood about an inch thick under one end so that the book sets in a slanting position. Now lay the boomerang flat on the upper surface of the book with the long end sticking out about 2 inches as shown at *B* in Fig. 2 and flip it sharply with the end of a pencil when it will sail through the air and return to the place it started from, nearly.

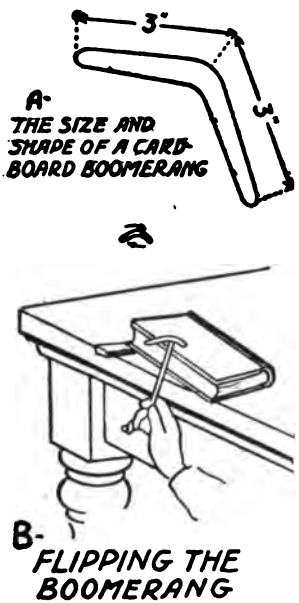


Fig. 2—A Cardboard Boomerang.

Magicians make an ordinary playing card do the same thing and you can too if you practice long enough. Hold a corner of the card between your first and second fingers and let the other corner rest against the ball of your thumb; then give it a spinning twist and throw it at the same instant into the air and it will return to you again.

How to Make and Throw a Real Boomerang.—To make a boomerang get a strip of hard wood 2

inches wide and 2 feet long and plane it down until it is $\frac{3}{16}$ inch thick.

Now cut the stick in two in the middle as shown at *A*, in Fig. 3, dovetail them together at the elbow and smear on plenty of good glue to make a strong joint. Whittle the ends to the shape shown at *B*,

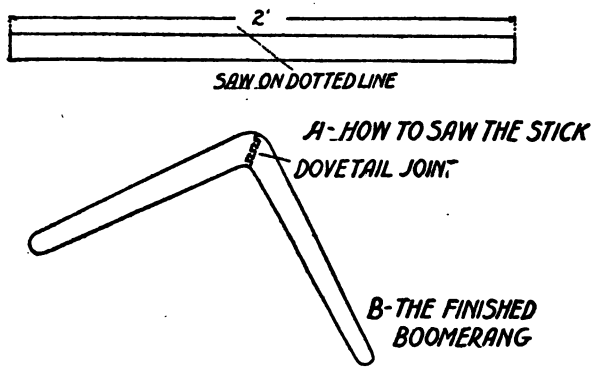


Fig. 3, A and B—A Real Home-Made Boomerang.

and you will have a boomerang modeled after one now in my possession made by a native Australian. The original, however, is made of a bent limb of a tree and this of course makes it much stronger.

To throw the boomerang grasp it by one end as shown at *C*, throw it with all your might, and as

it leaves your hand give it a circular motion as shown by the curved arrows in the picture, and it will come back to you.

The Discovery of the Sling.—It was just after the middle crust of the earth was formed, or the *Mesozic epoch* as it is called, that the first Stone Age boy lived and to him the credit has been given of the discovery of the *sling,* the first device ever used as an aid to throwing a stone.

Fig. 3, C—The Author Throwing the Australian Boomerang.

It happened in this fashion: that he might carry a supply of stones with him the primitive boy must needs have something to put them in, and the *pouched rat,* one of the earliest animals that lived and who carried its young in a natural pocket like a kangaroo, gave him the hint

he needed and he fastened one of the skins to the thong which formed his belt.

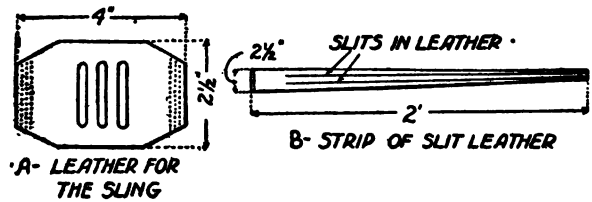
Idly swinging the pouch by the thong he let an end slip out of his hand when the remaining stone in it was thrown out with great force, and hitting a wild boar, it dropped him. Thus he had not only made a great discovery, but he had gained a dinner as well. After much tedious experimenting, for his brain was yet small, he produced the sling and as a means for throwing a stone with force and accuracy it has never been improved upon.

If you have never made a sling and known the joy that the prehistoric boy felt when he found he could throw a stone ten times as far with it as he could throw it with his unaided hand, you have missed one of your inherited rights. And with a little practice you ought to be able to use a sling even better than he did, for you have a long line of ancestry, from the time of David who slew the giant Goliath on down through the *Dark Ages*, that was mighty in its skill with the sling, as the following account taken from the twentieth chapter of the *Book of Judges* shows.

Look it up and you will find it is written there that in the town of Gibeah there were 700 picked men in the tribe of Benjamin, every one of whom was left-handed and whose aim was so true

that they never missed their mark, but hit it even to a hair's breadth. A mighty story, I trow.

How to Make and Use a Good Sling.—This is the way the boy of Bible times made his sling, and you can make one in the same manner. Get a piece of buckskin, or any other kind of strong, soft leather will do, and make it 2½ inches wide and 4 inches long, cutting slits in the middle as shown at *A* in Fig. 4.



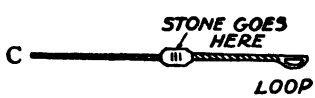


Fig. 4—A Sling of Olden Days.

Next cut two strips of the same kind of leather 2 feet long and make each strip 2½ inches wide at one end and tapering to 1 inch wide at the other end. Beginning about 6 inches from the wide end, cut two slits into the strip as shown at

B. Now braid the ends of these strips and sew the wide end of each one to one of the ends of the short leather with waxed thread. This done, make a loop of one of the braided ends as shown at *C*, and your sling is done.

To use the sling place a round pebble weighing a couple of ounces in the slit leather, hook your little finger into the loop, and grasp the other end between your index finger and thumb. Then whirl the sling round in a circle a few times until it has gathered the needed *momentum* and suddenly letting go the free end the stone will be thrown with great force and as straight as a die if you use it well.

The Invention of the Sling-shot.—The *sling-shot* is a greatly modified form of the sling of ancient days. It is an invention of recent date, for the process of *vulcanizing* rubber was not known until 1842, when it was discovered by Charles Goodyear, and hence the sling-shot must have followed at even a later date.

How to Make and Use a Sling-shot.—A sling-shot is made of (*a*) a *crotch,* (*b*) a pair of rubber strands and (*c*) an oval piece of leather. The crotch can be made of a Y-shaped limb of a tree, or sawed from a board and whittled into shape, or it can be made of heavy twisted iron wire.

For the rubbers use a pair of pure rubber bands (*para* is the best) ½ inch wide and 3½ inches long, and the leather should be about ¾ inch wide and 2 inches long, and cut a slit in the middle ¼ inch long. Fasten the leather to the rubber bands and these to the prongs of the crotch with short pieces of strong fish line.

To use the sling-shot put a small, smooth round stone in the center of the leather and hold it tight with the fingers of your right hand, that is, if you are right-handed. Pull back the leather with the stone in it to nearly the stretching length of the rubber and then taking aim suddenly let go, when the stone will shoot forth with great speed and a whizzing sound caused by the stone cutting the air.

The Discovery of the Bow and Arrow.—When the bright star *Vega* in the constellation of *Lyra,* and which is directly over your head at 9 o'clock on an August night, was the *pole-star*—that is, when it was in the place where the *North Star* is now—boys and men were still making and using stone tools and implements, and that was about 14,000 years ago.

This recent Stone Age boy was playing with the green limb of a tree which he had broken off and bending it he thought the tremendous thought of keeping it bent by tying its ends with a cord of

sinew and thus it was he became the discoverer of the stringed musical instrument and a weapon of the chase and of warfare at one and the same time.

He found by picking the string it would *twang* out a sound that thrilled him even as an urchin of today is thrilled by the music of a street piano. By trumming on the stretched sinew with a smaller stick he produced a new musical effect.

But his greatest achievement was when he held one end of a stick against the sinew and drawing it back he would let it slip when it would shoot to a distance of twenty or more feet. The bow and arrow had been discovered, and then on down through the ages of savagery and *medievalism* it was experimented with and improved upon until by the time the Battle of Agincourt was fought in 1415 it had reached its highest point of perfection and the men who drew the longbow in those days were the strongest and most skillful bowmen the world has ever seen.

The Witchery of Archery.—It was a long time after the bow and arrow had given way to firearms before they were again taken up by the palefaces, but this time it was a weapon of peace rather than one of warfare.

At various periods archery became a popular

sport for the exercise it offered the muscles and its value in training the eye has persisted to this day. Archery outfits can be bought of dealers in sporting goods,[1] and there are archery clubs to be found in several of the larger cities.

How the Bow is Made.—Get a good clear stick of yew, or hickory will do, ⅞ inch thick, 1¼ inches wide, and as long as you are tall. Trim it down with a *spoke-shave,* or your knife, until the stick is nearly oval around the middle for about 18 inches, taper the ends of it down until they are nearly flat and are ⅝ inch thick and ⅞ wide, and then cut a notch on each side of the stick about ½ inch from each end.

Stringing the Bow.—A selected hemp string about ⅛ inch in diameter should be used. Loop the ends of the string around the notches in the ends of the stick so that the string will be about 5 inches from the bow when measured at the middle. When not in use the bow should be unstrung or else it will become *fatigued,* as it is called in physics, and so lose some of its elasticity; and when the bow is put away for the season it is a good plan to rub it well with oil.

The Kind of Arrows to Use.—Your arrows

[1]All archery equipment can be bought from the Abercrombie and Fitch Co., 53 W. 36th street, N. Y. C.

should be made of clear, straight shafts of ash, deal, poplar or other whitewood, and these should be about ⅜ inch in diameter and 2 feet 6½ inches long. Cut a notch just large enough to fit the bowstring and ¼ inch deep in one end and sharpen the other end a little.

The haft, or notched end, must be *feathered,* and this is done by splitting a feather, cutting the edge off straight, making it about ⅜ inch wide and 5 inches long and scraping the *barbs* of the feather from the quill, or *shaft* as it is called, for a distance of ¾ inch on the large end of the quill and ¼ inch on the small end.

Fasten two of these feathers—three are better—around the head of the arrow at equally spaced points and this can be done by holding the feathers in place and wrapping the ends with strong silk thread.

How to Draw the Bow.—When you have picked the mark you want to shoot at face it so that your eye and the mark are in a line. Stand as straight as an Indian with your left foot in front. Hold the bow near the middle with your left hand, slip the notched end of the arrow on the bowstring with your right hand, and holding it there between your index and middle finger bring the bow to a vertical position as shown in Fig. 5; at the same time draw

Fig. 5—An English Longbowman.

the arrow back to about two-thirds of its length.

When ready to shoot the shaft of the arrow should be in a line with your eye and the mark. To take aim look at the mark and not at the arrow and the instant you get your aim let the arrow go. The place you hit will show how well you can use a bow and arrow. The Maricopa and Pima Indians of Arizona are so skillful they can shoot and kill a jack rabbit with a pointed arrow while chasing them on their mustangs.

The Discovery of the Crossbow.—It was in the *Middle Ages* that the longbow reached its greatest perfection, and the time was ripe for an improvement in the art of shooting. There were wonderful tournaments held by the bowmen of the various roving companies, and there was one archer whose mighty prowess was far-famed, for in virtue of his great strength he could bend a powerful bow and shoot an arrow farther than any one he had yet contended with.

At one of these tournaments was a doughty marksman of small size who had a shorter and stiffer bow than those commonly used and as the others shot he watched the flight of the arrows with small interest. When his turn came he sat him down upon the ground, braced his feet against the bow, slipped an arrow on the string and with

the tremendous leverage thus gained he bent the bow until it was almost double.

To the surprise of every one except those of his own company his arrow flew nearly twice as far as that of the giant bowman bracketed as his peer. It was in this strange way that the principle of the crossbow was discovered.

The Development of the Crossbow.—After the first raw idea, or *inductive discovery* as it is called, had disclosed to the thinking archer the principle of the crossbow it was not long before other geniuses began to improve upon his scheme for the age of invention and of iron was at hand.

The simplest form of crossbow was a straight wooden stick with the bow fixed to one end and a notch cut near the other end to hold the string after it was drawn back, but it was hard to release the string and make it catch the arrow, and this soon led to the making of a trigger to release the bowstring.

Following this great improvement came the grooved guide for the arrow, which corresponds to the barrel of a gun, for the purpose of making the arrow shoot straight. It was perfectly natural that the next improvement should be a gunstock, so that the crossbow could be rested against the shoulder, and then came the sights.

By this time the bow was made of steel instead of wood, and since steel is much stronger and is more elastic than yew wood, the bow was made

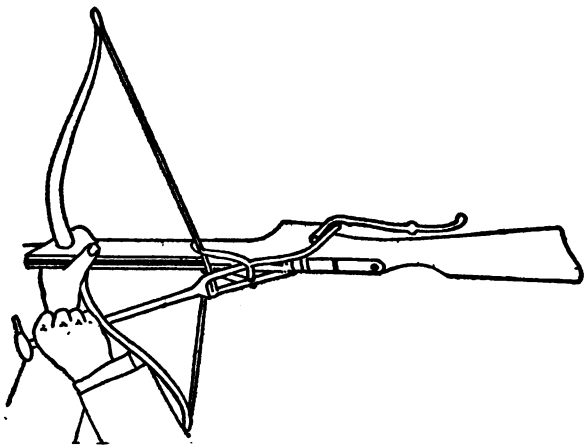


Fig. 6—An Ancient Crossbow and Method of Drawing It.

much shorter and thicker and to tell them apart when speaking the yew bow was called the *long-bow,* while the other was known as a *crossbow,* or *arbalest.* Finally the springs were made so short and stiff that a powerful mechanical device was needed for pulling the bowstring, and when this was invented and applied to the crossbow it took on the appearance shown in Fig. 6.

Other small improvements were made until the crossbow had a gunstock, a steel barrel, an improved trigger with trigger guard and front and rear sights, all of which is shown in Fig. 7; in fact, as you will plainly see, it was but one step removed from a firearm. All that was needed was an explosive to shoot a ball, a means for lighting it, and the brain of a genius to point the way to do it, and this was soon forthcoming.

How to Make and Shoot a Crossbow.—From an oak or other hardwood board, 1 inch thick, 8

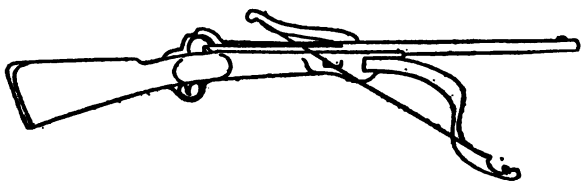


Fig. 7—Crossbow with Barrel and Front and Rear Sights.

inches wide and 3 feet long, cut out a stock and barrel as shown at *A* in Fig. 8. Measure off 12 inches from the end of the stock and cut out a slot with a chisel ½ inch wide and 3 inches long clear through from the top to the bottom. Now with a ½-inch round chisel starting at the end of the barrel cut a deep groove for the arrow to rest in, and then cut a notch in the end of the barrel for the bow.

The trigger can be made of wood, but brass is better. Get a ⅜-inch piece of square brass rod and cut off a piece for the *lock* (see *B*, Fig. 8), 2½ inches long, make two notches in it as shown in the cut and drill a ⅛-inch hole in the lower

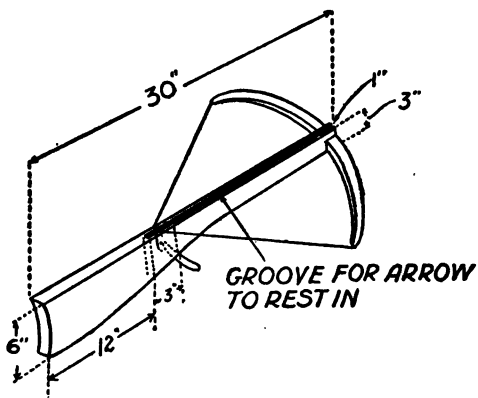


Fig. 8, A—The Size and Shape of the Crossbow.

end; cut off another piece for the *trigger* 3 inches long and drill a ⅛-inch hole 1 inch from the top end. Set these pieces in the slot of the gunstock exactly as shown at *B*, drive a nail through the stock and the hole in the lock and another one through the stock and the trigger to serve as pivots, and cut the ends off close up to the stock.

The action of the lock is this: when the string is pulled back and caught in the notch of the lock it has of course a tendency to pull the lock forward but it is prevented from so doing by the end of the trigger which is thrown over into the notch.

When the trigger is pulled the upper end slips out of the notch, the bowstring pulls the lock forward and out of the way when the string hits the

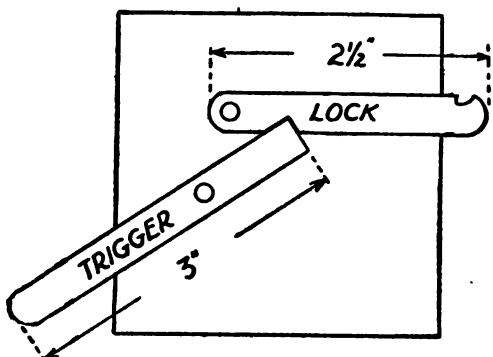


Fig. 8, B—How the Action Is Made.

arrow, carries it with great force along the groove in the barrel, and shoots it into the air.

To shoot the crossbow set the trigger and lock, and put an arrow into the groove; rest the stock firmly against your shoulder and sighting along the arrow pull the trigger.

CHAPTER II

THE INVENTION OF THE GUN

ALMOST at as early a date as the invention of the bow and arrow another and an entirely different weapon was discovered by the primitive boy, and this is what we call a *blowgun.* It was simply a hollow reed in which a small stone was placed and then blown out with great force by the mouth.

The Blowgun of the Savages.—Powerful blowguns are used at the present time by some of the savage Indian tribes of South America and the Dyaks, an aboriginal race of Borneo.

The blowgun used by them is made of a reed, or the stem of a small palm, has a bore of ⅜ or ½ an inch in diameter, and is from 8 to 12 feet long. Instead of stones arrows are used in them, and these vary in length from 1½ to 18 inches.

The arrows of the South American Indian are made from the spine of a palm and the sharp points are poisoned with *curari* and then notched to make them break off in the wound. A bit of soft down from the *silk-cotton tree* is wrapped

round the shaft of each arrow to make it fit the tube air-tight. The Dyaks point the heads of their arrows with sharp fish teeth and poison them with *upas juice,* while the shaft is fitted with a piece of pith to make it fit the tube exactly.

Both races blow these arrows with great force and accuracy and can easily hit and kill a fellow at a distance of over 100 feet.

How to Make and Use a Blowgun.—Get a perfectly straight tin tube, or better a seamless brass tube, with a ¼-inch bore and 18 inches long. Use pellets of putty and blow quick and hard. With very little practice you can hit the bullseye of a target at 50 or 60 feet as certainly as you can with a rifle, and it is great sport to use it to shoot at a mark.

The Invention of the Air Gun.—The air gun was invented in France about 1768. These early guns were operated by compressing the air in a cylinder fastened to the barrel of the gun and then releasing the air behind the bullet. This scheme was so hard to work that the air gun did not become popular until the *spring type* of gun was made in this country along in the '70's.

The first air rifles were made by H. M. Quackenbush of Herkimer, New York, and these were of the spring type; that is, the spring was compressed

by means of a lever and when the trigger was pulled the plunger pushes forward and compressed the air. To Charles F. Lefever of Plymouth, Mich., is due the high development of the air rifles on the market today.

How the Air Rifle Works.—The operation of the No. 25 pump-action Daisy air rifle, which is shown

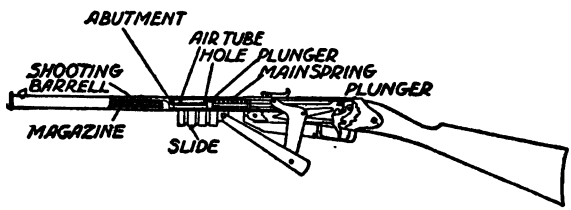


Fig. 9, A—How an Air Rifle Is Made.

at *A* in Fig. 9, is like this: when the plunger is retracted by pulling back the *slide,* the *mainspring* is compressed and the *plunger* is made to engage the *trigger;* then the slide, or handhold, is returned to its normal position. When the trigger is pulled and the plunger released the action of the mainspring pushes the plunger forward and compresses the air between the plunger and the abutment.

During the action of loading, the air-tube, which telescopes inside of the shooting barrel, is withdrawn and permits a bullet to drop from the magazine into the shooting barrel. After the gun is

fired the air that is compressed passes through a small *hole* at the back of the air-tube and enters directly behind the bullet. The shooting, or true barrel, is *swaged,* that is, pressed, directly in front of and behind the point where the bullet enters the barrel and the bullet is kept from rolling out by this means.

When the plunger rushes forward the air-tube pushes the bullet through the swaging in the barrel thus making all the bullets of the same size. The

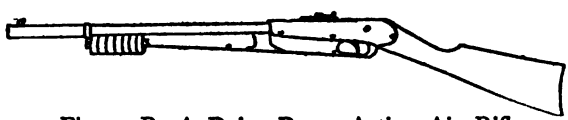


Fig. 9, B—A Daisy Pump-Action Air Rifle.

air in this kind of a gun is compressed after the trigger is pulled. A Daisy pump-action repeater is shown at *B,* Fig. 9. It weighs 3¼ pounds, sells for $3.50, and has a shooting range of from 125 to 150 feet.

The Discovery of Gunpowder.—Since the word *gun* is taken to mean any device having a tube and through which a missile of any kind is shot, the ancient crossbow which was fitted with a barrel and shot stones or bolts could without any great stretch of the imagination be called a *gun.* But it was the discovery of *gunpowder* which made the

invention of the gun possible as we know it today. The discovery of gunpowder came about in a very curious way. The love of Chinese boys—and this includes the men, for they are only boys grown up—for fireworks is well known and in trying to find new and startling effects in colored lights and scintillations the civilized Chinese boy carelessly mixed some powdered *saltpetre, charcoal* and *sulphur* together and inclosing it in a thick paper tube, like a Roman candle, he lit it.

And when he had recovered from the shock of the explosion he found that he had made not only the first firecracker, but what was of more importance that he had discovered the first explosive and that was gunpowder; and all of this happened about the year 600.

How the Gun Was Invented.—About 600 years after the discovery of gunpowder—that is, in the year 1200—an Arab boy traveling in China learned from a Chinese boy the secret of making both gunpowder and firecrackers and tucking these ideas in the back of his head he carried them home with him to Bagdad.

The fact that the gunpowder burned gently in the open air, but caused an explosion when it was confined in a tube, interested the thinking Arabs and one of them—most likely a boy—tried the experi-

ment of putting some of the gunpowder in a metal tube one end of which was closed up. A fuse, also made of gunpowder, was led to the powder inside the barrel and a round stone was dropped into the tube.

When the fuse was lit it *ignited* the powder and —*bang!*—the stone shot out, the recoil kicked the tube back, and if the Arab inventor lived to tell the tale he was indeed lucky; but anyway he was the inventor of the explosive gun.

In turn the invention of the gun was carried back to China and the *priming-hole,* or *touch-hole* as it is called, that is the small hole near the *breech,* or closed end of the tube into which gunpowder is poured to *prime* and fire the gun, was the next improvement in order. The first recorded use of the gun in warfare was in 1234, when the Chinese army under Genghis Khan employed it.

Nearly forty years later Marco Polo, an Italian boy traveler, went to China, and when he returned to Italy he told a wonderful story about the guns and gunpowder he had seen, and it was this boy who really introduced the explosive into Europe. About sixty years later a powder-mill was set up in Germany, and shortly after that guns fired with gunpowder were used at the Battle of Crécy, which was fought in 1346.

The Earliest Known Gun.—One of the oldest guns in existence is a Chinese *hand-fuse gun* in the collection of Francis Bannerman of New York City.

This ancient gun is merely a bronze tube having a bore 1 inch in diameter and a barrel 12 inches long. It is cast in one piece of metal and has a wooden *haft,* or handle, 10 inches long fixed to and in a line with the barrel so that it can be held and aimed. A swivel is also fixed to it which permits

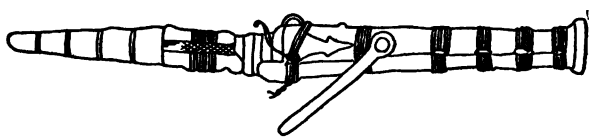


Fig. 10—The Earliest Hand Gun to Use Powder.

it to be rested on any convenient object and steadied when it is fired, all of which is shown in Fig. 10.

The barrel is reinforced with a piece of wood on either side held in place with split bamboo wrapped around it. It was fired with a *match,* which means a slow-burning fuse, and this was held in the hand and applied to the touch-hole.

This extremely crude gun, hoary with age and a relic of the dead past, was probably made very shortly after the introduction of guns for the pur-

pose of warfare. Old and crude as it is it was nevertheless the forerunner of the modern gun.

The Development of the Modern Gun.—Since the last and most improved crossbows had, as we have seen in Chapter I, a *lock,* which means the trigger mechanism, a gunstock and a barrel, it required small inventive ability to add these features to the Chinese gun. To put on a trigger to

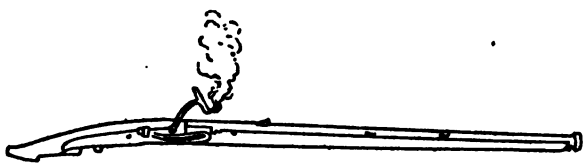


Fig. 11—An Ancient Chinese Matchlock Gun.

fire the gun seemed to be the hardest part of the early gunsmith's job and it was the most necessary, but all these things and other inventions were worked out step by step as we shall see forthwith.

The Matchlock Gun.—The first gun that had a trigger was called a *matchlock* gun, or just *matchlock* for short, in virtue of the fact that the powder was lighted with a *match*—that is, a fuse—which was held in a *lock,* or lever, and which was in turn worked by a trigger as shown in Fig. 11.

When the trigger was pulled it brought the lock down to the touch-hole and coming in contact with

the powder ignited it, and this was a good deal safer than for the *musketeer* to light the powder by applying the match with his hand. The word *musket,* by the way, comes from the French *mousquet,* which in their language means *gun,* but any kind of a smooth-bore gun was known as a musket.

This early type of gun, which was invented in 1476, was fitted with sights and a fairly well shaped stock, so that it could be easily and firmly rested against the shoulder.

The Touch-pan.—A further improvement in the matchlock was the introduction of the *touch-pan,* as it was called; the pan was fastened to the barrel and a small hole was drilled through it to the touch-hole when both were filled with powder. When the trigger was pulled the cock holding the match or fuse fell on the powder in the pan and lit it and the fire ran through the touch-hole into the barrel as before.

The stock of the gun had also been improved and the butt end was made in the shape of a crescent in order to fit the shoulder better. The matchlock was loaded with powder, then some paper was rammed down on top of it with a ramrod, a lead bullet was loaded in the gun and more paper was rammed down on it to hold it in place. It was

necessary for every gunner to carry along a ramrod, matches, bullets and a powderhorn.

The First Rifled Gun.—While a rifle is generally understood at the present time to mean a gun which shoots a cartridge—see the chapter on *Ammunition*—yet any gun which has grooves cut in the inside of the barrel is a rifle.

About 1498 a gunmaker of Leipsic, Germany, invented the rifle, that is, he was the first to cut spiral grooves in the barrel, the purpose of which is to give the bullet a *rotary* motion after it has left the barrel and so make it shoot straighter. Since the operation of cutting the grooves is called *rifling* it is easy to see how the rifle got its name.

Although guns with rifled barrels were made at various times for many years after rifling was invented, it was not until the Revolutionary War in 1776 that its use became at all popular. The rifle as it is made and used at the present time is explained in the next chapter.

The Wheel-lock Gun.—The next noteworthy improvement in guns was the invention of the *wheel-lock* (see Fig. 12), in or about 1510. A few of these guns were made with *smooth bores,* but the larger part of them were *rifled,* and so part of them were *muskets* and the others were *rifles,* though they shot the same kind of bullets.

The wheel-lock was the first gun to do away with the lighted fuse of the matchlock. It was formed of a small steel wheel about 1/8 inch wide and having a milled *periphery,* or rim; a spring was fastened to the wheel and when the trigger

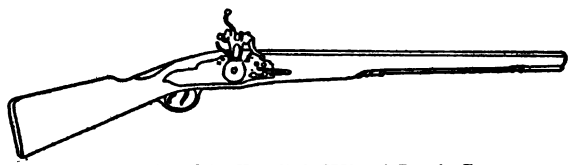


Fig. 12—An Old English Wheel-Lock Gun.

was pulled it released the spring which made the wheel go round.

A bit of flint was fixed over the wheel, and this rubbed against the rough edge of the latter when it turned, thus making a lot of sparks which ignited the powder in the *flash-pan* and the fire was carried to the barrel. The wheel-lock was slow in operation because it had to be wound nearly every time it was used. It was invented in 1525.

The Flintlock Gun.—Curiously enough no further improvement of the gun was made in the next hundred years or so, which is pretty good evidence that the wheel-lock gave a very fair measure of satisfaction, and then came the *flintlock* gun, which was invented in Spain about 1625. It is shown in Fig. 13.

The flintlock worked on the same principle as the wheel-lock, that is, a flint and steel were struck together to make the sparks, but the construction of the flintlock was quite simple in that the flint was held in the jaws of the cock and when the trigger was pulled it struck the steel cover of the

Fig. 13—A Revolutionary War Flintlock Gun.

pan, opened it, and the sparks ignited the touch powder in it.

Flintlock guns were made with both smooth-bore and rifled barrels, though the former were the most common, and both of these were loaded with powder and bullet just as the early matchlock and wheel-lock guns were.

The Blunderbuss.—Do you remember the picture of the Pilgrim Fathers going to church, shortly after they landed at Plymouth Rock in 1620, and each one carrying along with his Bible a queer-looking gun to protect himself and family from the Indians? Well, the kind of a gun he carried is called a *blunderbuss,* or scatter gun, and some of them were made with wheel-locks, while

others were made with matchlocks for firing the powder.

The *blunderbuss,* as shown in Fig. 14, is a gun having a short barrel, with a large bore and a funnel-shaped muzzle. It was loaded with *shot*—that is, pellets made of lead—a number of these

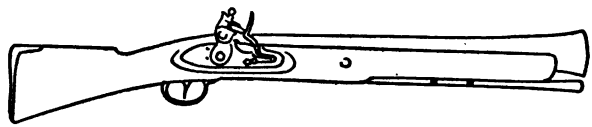


Fig. 14—An Old English Flintlock Blunderbuss.

being used instead of a single bullet, and when the gun was fired the flanged mouth spread the shot—and also the Indians—for at short range it did great execution.

The Dutch called this gun a *donder-bus* because it made a loud noise when it was fired; now since *donder* in their language means *thunder* and *bus* means *box* it has come to be called by the elegant and *euphonious* name of *blunderbuss.*

It is no longer made as a gun, but the funnel-shaped barrel is still used by magicians, who find it a valuable aid in disappearing small articles in a big noise and in a cloud of smoke. What is of greater importance is to know that the blunderbuss is the daddy of the modern *shotgun.*

The Tube-lock Gun.—The next improvement in the firing lock of guns was a real invention, for it did away with the uncertain and troublesome flint and steel.

In the touch-hole of the gun a *primer* of *fulminate powder* was inserted, and when the cock, or *hammer* as it was now called, struck the primer the blow exploded it, and this in turn fired the

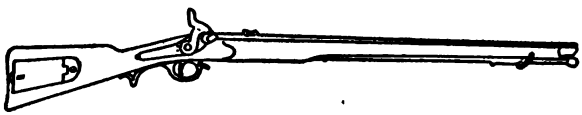


Fig. 15—An Early Percussion-Lock Gun.

powder in the barrel. The fulminate, which is a compound of *fulminic acid,* is violently explosive, and this was contained in a copper tube which was set in the touch-hole.

The Percussion-lock Gun.—Following a few small improvements on the *tube primer* gun came the *mushroom percussion cap* gun. This gun was made with a *nipple tube* screwed into the touch-hole as shown in Fig. 15. The percussion cap was a brass or copper tube with a flange on it, and the tube which had the fulminate powder in it was slipped into the touch-hole in the nipple, the flange preventing it from going in too far and permitting it to be extracted easily.

The Percussion Cap.—The next step in improving the gun was to make a simple brass cap to fit over the nipple and to put a thin film of *fulminating mercury* and *chlorate of potash* in the closed end. The percussion cap type of gun came into use about 1830.

Up to this time all guns had been *muzzle-loading,* that is, they were loaded from the muzzle of the barrel. This was done by pouring a charge of powder into the barrel and then ramming down a heavy wad of paper on top of it; the bullet or shot was then dropped in on the wad and another wad of paper was rammed down to keep the lead in place.

These operations were performed with a long, straight rod of iron called a *ramrod* which the gunner always carried along with him, and to get it out of the way when not in use it was slipped through a couple of rings under the gun.

The Breech-loading Gun.—Shortly after the percussion cap came into use a great change was made in the design and construction of the gun which made the fine, quick-firing guns of the present day possible and this included two separate and distinct inventions each of which was dependent on the other. The earliest type of breech-loader is shown in Fig. 16.

These two inventions were (1) the *breech-loading gun* and (2) the *cartridge* which contained the charge. To make the gun so that it could be loaded at the breech it had to be *broken,* that is, the barrel had to be hinged at the lock in order to load a cartridge into it.

The cartridge was made of a flanged brass case in which the fulminate cap, the powder and the ball

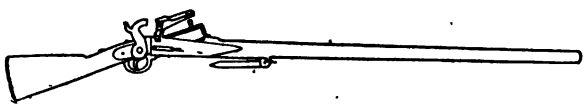


Fig. 16—The Earliest Breech-Loading Gun.

were placed. The cap was in the center of the back of the cartridge and when the firing-pin of the hammer struck the cap it exploded by percussion.

The Last Two Types of Guns.—After the cartridge was invented two general types of guns came into use and these are known as (1) the *rifle* and (2) the *shotgun.*

The rifle is a gun of quite small bore, has a rifled barrel, and uses a *cartridge* with a bullet, while the shotgun is a gun having a large, smooth bore and uses a *shell,* that is, a large cartridge in which shot are loaded.

After the invention of the single-shot breech-

loading gun, the cartridge *magazine gun* which would shoot a number of rounds invited the attention of inventors, though the idea of a repeating gun was not at all new, but the means were at hand to fulfill the conditions required and the *repeating gun* came forth, as we shall presently see.

CHAPTER III

THE MODERN GUN

WHILE there are many different makes of guns on the market, all of them come under two general classes and these are (1) *sporting guns* and (2) *military guns.*

Sporting Guns.—Again sporting guns, which mean guns made especially for pleasure purposes such as target-shooting and game hunting, can be divided into two sub-classes, and these are (*A*) the *sporting rifle* and (*B*) the *sporting shotgun.*

Further, there are four different kinds of rifles as well as of shotguns, and these are known from each other by their *actions,* that is, the manner in which they work. Named these guns are (*a*) the *single-shot* rifle and shotgun; (*b*) the *repeating lever action* rifle and shotgun; (*c*) the *repeating pump action* rifle and shotgun; and (*d*) the *auto-loading* rifle and shotgun.

Single-shot Guns.—*The Single-shot Rifle:* The single-shot gun, as you will gather from its name, has to be loaded every time a shot is fired. The action of an ordinary *single-shot rifle* is shown in

Fig. 17. Now let's see how this gun works, and so we'll start at the beginning and suppose that you have just slipped a cartridge into the *firing chamber;* this done you close the *finger lever* which pushes the *breech-block* back over the chamber, and

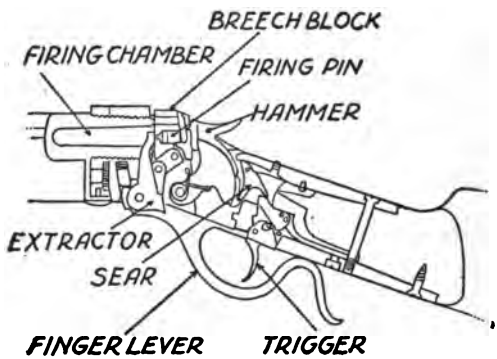


Fig. 17—The Mechanism of a Single-Shot Rifle.

to fire the gun all you have to do is to pull the *hammer* back to *full-cock* and pull the *trigger.*

Having fired the gun the empty cartridge of course still remains in the firing chamber; when you push the finger lever down the breech-block is pulled down with it and this shoves the hammer back to *half-cock,* which means that the *sear* catches in the lower notch of the hammer.

When the trigger is in this position it can't be

pulled, hence the hammer is locked and the gun can't go off *prematurely;* this scheme of locking the hammer was one of the first real safety devices that was applied to guns, and it is a good one.

At the same time the finger lever is pushed down the *extractor* slides forward and pulls the cartridge out of the chamber a little way, when you can pull it all the way out with your fingers. Now slip a new cartridge into the chamber, and you are ready to fire again.

The *firing mechanism* of this and all other guns is fitted in the breech-lock or bolt and is formed of a pin, called a *firing-pin,* which slides through it. When the hammer strikes the outside of the breech-block it drives the firing-pin up against the cartridge and so explodes it.

The Single-shot Shotgun.—The use of the finger lever on the single-shot shotgun has never been popular, and for this reason this type of gun is made a little different from the single-shot rifle just described.

Although the trigger mechanism is about the same as that of the single-shot rifle, the ejecting system for throwing out the used shell is quite different. To follow the action of the *ejector,* as the whole ejecting system is called, let's suppose that a cartridge which has just been fired is still

in the chamber of the barrel, the latter in the shotgun being hinged near the breech.

In this gun a catch is released by hand, when the barrel breaks at the breech and tilts up and as it does so it forces the hammer to half-cock and the *extractor,* which in most guns slides along the bot-

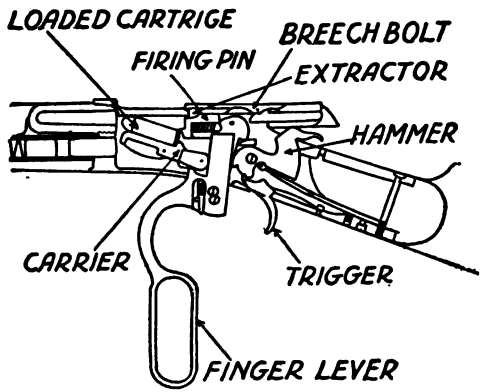


Fig. 18, A—Lever Action of a Repeating Rifle (Action Open).

tom of the barrel, catches the rim of the cartridge and flips it clear out of the barrel.

A new cartridge is then slipped into the chamber, the barrel is closed up and the hammer can be drawn back to full-cock.

Repeating Lever Guns.—*The Repeating Lever Rifle:* The repeating lever rifle is a big improve-

ment over the single-shot rifle in that a large number of shots can be fired without reloading the gun, the number depending on the length of the *magazine* which holds the cartridges and the *caliber* of the cartridges used.

A *cross-section view* of a typical repeating lever action rifle is shown at *A* and *B* in Fig. 18. In this

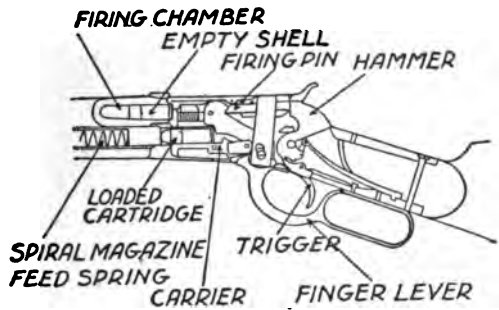


Fig. 18, B—Lever Action of a Repeating Rifle (Action Closed).

kind of rifle the cartridges are held in a *tubular magazine* which is fixed to and under the barrel and extends its full length. At *A*, in Fig. 18, the rifle is shown with the finger lever open.

The action of the rifle is like this: the spiral feed spring in the tube of the magazine forces a cartridge into the *carrier*, and when you press the finger lever down the carrier, with the cartridge in it, is moved upward toward the chamber; at the

same time the *breech-bolt* and ejector, which are made in one piece, slides back and carrying the empty cartridge with it the latter is thrown out of the top; while this action is taking place the hammer is forced back to full-cock.

When the finger lever is pulled up into place, as shown at *B*, in Fig. 18, the breech-bolt shoves the

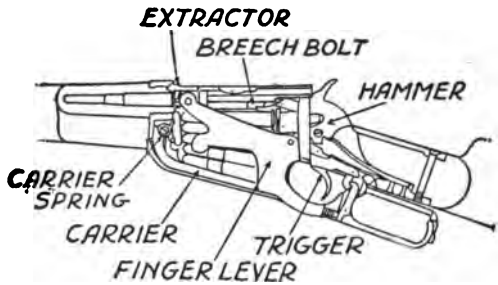


Fig. 19, A—Lever Action of a Box Magazine Rifle (Action Closed).

cartridge from the carrier into the chamber and pushes the carrier down into position again, when the spiral spring in the magazine presses another cartridge into it.

Another and most important kind of lever-action rifle uses what is known as a *box magazine*. You can get a very good idea of the way in which this rifle works by looking at the cross-section views *A* and *B*, Fig. 19.

The carrier in this gun is operated by a spring, and it keeps on feeding cartridges into the chamber at each action of the lever, as long as there are cartridges in the magazine. Clips carrying five cartridges are furnished for this rifle and all that is

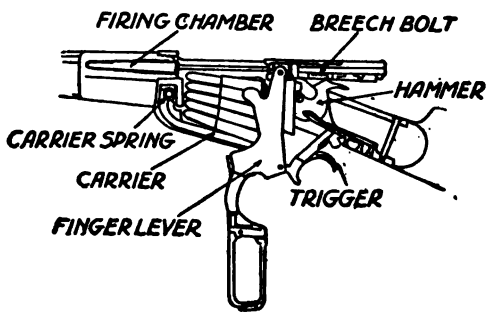


Fig. 19, B—Lever Action of a Box Magazine Rifle (Action Open).

needed to reload the gun is to slip a new clip into the magazine.

The Repeating Lever Shotgun.—The action of the repeating lever shotgun is very nearly like that of the repeating rifle in the main features, although there are, of course, some differences in the smaller parts.

As an illustration in one of the repeating lever shotguns on the market the breech-bolt is entirely enclosed, and instead of sliding straight back it

slides downward with a rotary motion; and is just the same with the exception of a few other minor things.

Pump-Action Guns.—*The Pump-Action Rifle:* A pump-action gun is better than a lever-action gun, since with the former you never have to take your

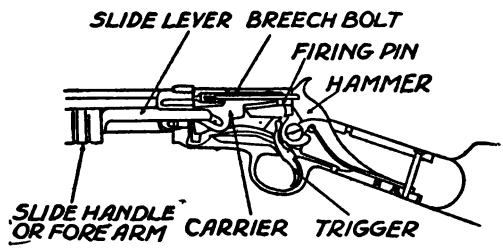


Fig. 20, A—A Pump-Action Repeating Rifle (Action Closed).

finger off of the trigger and you can often make shots with it that you would lose with a gun of the latter kind.

A pump-action rifle is shown at *A* and *B,* in Fig. 20. The action of the rifle is shown closed at *A* and open at *B*. Looking at these cuts you will see that when the *slide handle,* or forearm, is pulled back toward the breech it forces a cartridge into the carrier; with the same movement the breech-bolt carrying the empty cartridge with it is forced back, and this pushes the hammer back to full-cock,

As the handle is brought back into place the breech-bolt pushes the cartridge into the chamber of the barrel and the carrier is forced down into position ready for another cartridge.

Another kind of pump-action rifle is ***hammerless,*** and ejects the cartridge out of the side in-

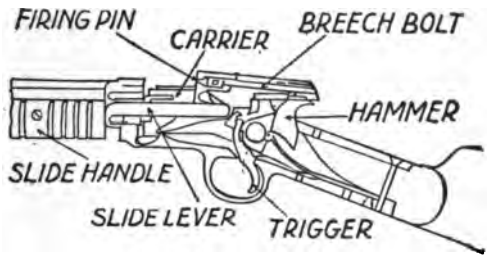


Fig. 20, B—A Pump-Action Repeating Rifle (Action Open).

stead of out through the top. This rifle also has the advantage of having a solid breech-block instead of a movable one, and this considerably lessens the danger of the *back-firing* of the cartridge.

The side ejection of cartridges offers another good feature in that the empty cartridges are thrown out away from your face.

The Repeating Pump-Action Shotgun.—The repeating pump-action shotgun is even more simple in its operation than the pump-action rifle. By referring to *A* and *B,* Fig. 21, you will see at once that the carrier of the rifle and the shotgun work

a little differently from each other. The carrier in the shotgun has a *rocker action* when the slide

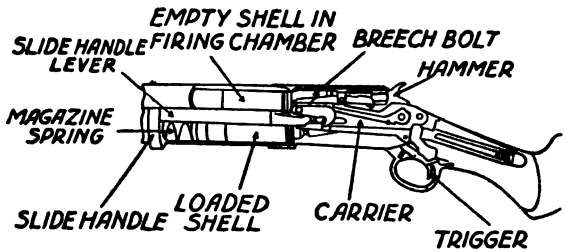


Fig. 21, A—A Pump-Action Repeating Shotgun (Action Closed).

handle is pulled back, that is, the carrier rocks down below the frame of the gun and catches the shell which the magazine spring forces into it.

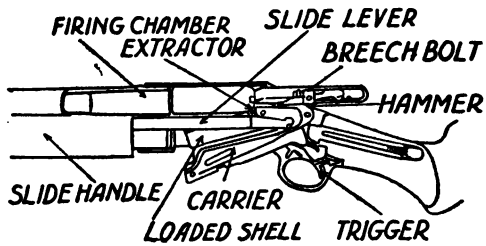


Fig. 21, B—A Pump-Action Repeating Shotgun (Action Open).

When this action takes place the breech-bolt slides back, carrying the empty cartridge with it, and when the slide handle is closed the carrier

moves up *parallel* to the breech and the breech-bolt shoves the loaded cartridge into the chamber.

Auto-Loading Guns.—*The Auto-Loading Rifle:* The auto-loading gun is not a new idea by any means, but it is only in recent years that it has been perfected, and as it is now made it is one of

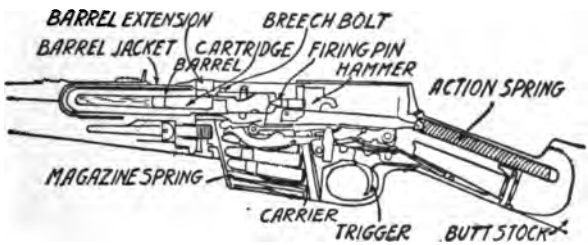


Fig. 22, A—The Action of an Auto-Loading Rifle (at the Moment of Firing).

the finest, cleanest, quickest and easiest-firing guns on the market.

Look you now at *A, B, C, D,* Fig. 22, and you will see a moving picture, nearly, of the action of a box magazine, auto-loading rifle from the moment of firing clear on through each operation until the new cartridge is slipped into the firing chamber.

In the picture shown at *A* the hammer has just struck the firing-pin and exploded the cartridge. As soon as the cartridge has been fired the *recoil,* which is instantly developed by the exploding gases

of the powder, drives the breech-bolt to the rear, bringing the cartridge with it as well as the *barrel extension,* which is locked to it as shown at *B*.

This action compresses the heavy recoil and *action spring* in the *butt stock,* and which is shown fully compressed, the trigger being cocked in the cut *B*. Just as soon, though, as the recoil is spent

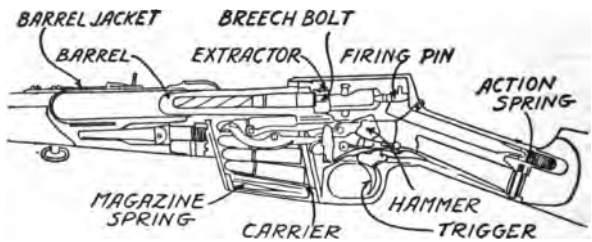


Fig. 22, B—The Action of an Auto-Loading Rifle (Recoil Driving Back Breech-Bolt and Barrel).

the *recoil spring* draws the barrel forward, and this leaves a space for the empty shell to be ejected as shown at *C*.

When the extension barrel has gone forward to its natural position the spring carrier of the magazine pushes another cartridge into place, and at the same time the barrel presses on a catch which releases the breech-bolt and allows the recoil spring to drive the breech-bolt home, and so pushing the cartridge into the chamber. When the breech-bolt

has completely closed the opening the gun is ready to fire again. In this way the untoward action of the recoil is made to do useful work.

The Auto-Loading Shotgun.—The action of the auto-loading shotgun is just about the same as that of the rifle except that a tubular magazine is used

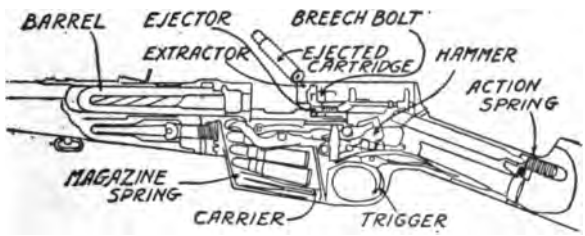


Fig. 22, C—The Action of an Auto-Loading Rifle (at the Moment of Ejecting the Shell).

for the shells instead of the box magazine used for cartridges.

The shotgun is made to eject the cartridges through the side instead of through the top, but aside from these small matters of detail in the construction, the rifle and the shotgun work in the same manner.

The Kind of a Gun to Buy.—When you buy a rifle or a shotgun for sporting purposes it is quite natural and perfectly proper for you to want the best. Whether you get it or not—well, that's another question.

Never buy a rifle with less than a 20-inch barrel and one with a 24-inch barrel is better, for this is about the right length for a good, straight, hard-shooting gun. My son has used a Marlin lever-action repeating rifle ever since he was fourteen years old, and he has never had the slightest trouble with it.

As to shotguns, I like a double-barreled shotgun with 30-inch barrels better than I do a repeating

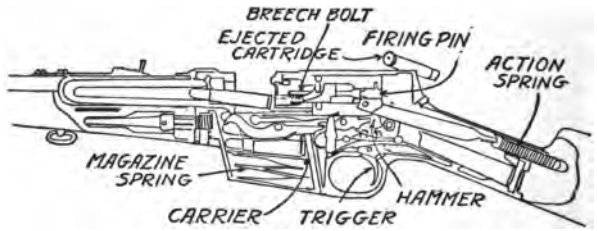


Fig. 22, D—The Action of an Auto-Loading Rifle (Spring Forcing in New Cartridge).

gun, though I have used both the lever-action and pump-action gun; but there is a charm about loading your gun by hand that sportsmen of the old school like myself never get over. Even our own Ben Franklin advocated the use of the crossbow as against the flintlock, and he wasn't exactly what you would call an old fogy either.

But since you are a young American with the red blood of your forefathers, who fought with

muskets in the Revolution and the Civil War, coursing through your veins, you should have the most approved, up-to-date gun you can afford to buy, and so get either a lever- or pump-action, or better an auto-loading gun where all you have to do is to pull the trigger like an automatic pistol until the magazine is empty.

As I said before, the pump-action gun is far better than the lever-action gun, for your finger never leaves the trigger. And when it comes to the auto-loading gun it is my opinion that it will finally take the place of all the others. It is as safe as, if not safer than, any other style of gun, and for trap and wing shooting you can't beat it, for it places at your command six shots which can be fired one after another without shifting your position one iota. The auto-loading gun also has the advantage of taking up nearly all of the recoil that in other guns reaches the marksman's shoulder.

Military Guns.—In the barbarous days of old—of course we're highly civilized now—warfare was waged very differently from what it is today.

The gun of yesterday was made as deadly as possible—that is, it gave the bullet great stoppage power, which means that once it hit a man, however slight the wound it made, he was almost sure to die from the effects of it.

To get this deadly effect *dumdum,* split and hollow-nosed bullets that mushroomed when they hit and inflicted terrible flesh wounds were used. But in the last few years governments, like the human race in general, have acquired a little more sense, and so are a trifle more humane; and although war is waged by every nation if only given half an excuse to fight, they have agreed to use bullets which if they do not kill when they strike are less apt to kill afterward.

The three chief differences between a military rifle and a sporting rifle are (1) that the military rifle is of the bolt-action type; (2) the military rifle has a forearm that extends to nearly the length of the gun, and (3) the military rifle uses jacketed bullets.

Nearly all modern military rifles use a *cupro-steel* jacketed bullet which makes a clean-cut wound and if this hits a man anywhere except in a vital organ the wound will heal quickly, or at least this is the theory of the theorists.

The U. S. Springfield Rifle.—This is the gun that is made and used by the United States government, and it is called the *Springfield* in virtue of the fact that it is made by the government at Springfield, Mass.

It is a bolt-action clip magazine .30-caliber, 5-

shot rifle and weighs 8.6 pounds. A top view of it is shown at *B* in Fig. 23 and a cross-section side view is shown at *A*, while both pictures show the gun loaded and ready to fire. When the trigger is

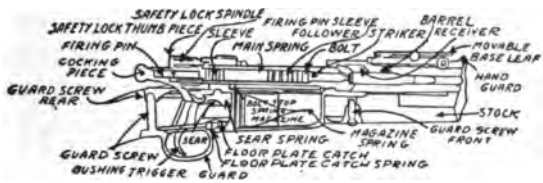


Fig. 23, A—The U. S. Springfield Service Rifle (Cross Sectional Side View).

pulled the coiled mainspring is released and this drives the firing-pin up against the cartridge in the chamber and so explodes it. The handle of the bolt is then raised until it is in contact with the left side of the receiver and pulled directly to the rear as far as it will go. This causes the extractor to start the fired cartridge from the firing chamber and compresses the mainspring. It also forces the firing-pin to the rear. How the action is worked is shown at *C*, in Fig. 23.

As this backward movement of the bolt-handle is completed the ejector flips the empty shell out to the right. The magazine spring then forces a cartridge up, and when the bolt-handle is pushed

forward and closed the cartridge is pushed into the firing chamber and the gun is ready to fire again. The gun can also be cocked by pulling the *cocking-piece* directly to the rear.

The *Springfield cartridge* is made of an alloy of lead and tin and has a cupro-nickel jacket, that is, a jacket made of an alloy of copper and nickel.

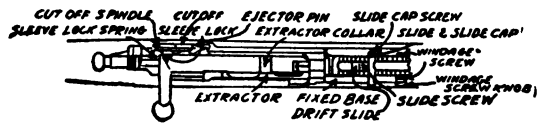


Fig. 23, B—The U. S. Springfield Rifle (Cross Sectional Top View).

This rifle has a muzzle velocity of 2,700 feet per second and is sighted to 2,850 yards, although its maximum range is 4,891 yards, which it covers in 38.058 seconds. When the gun is loaded by inserting a cartridge at a time 23 shots can be fired in one minute, while the magazine permits 25 shots to be fired a minute.

Foreign Military Rifles.—The bolt-action rifle has become the favorite military rifle of today, and it is either provided with a box, clip or tubular magazine which in some guns is contained inside the stock.

The forearm of the military rifle is extra long,

extending to the muzzle in most models. The purpose is to protect the soldier's hands from the intense heat of the barrels that is produced by the smokeless cartridges which are in use by all coun-

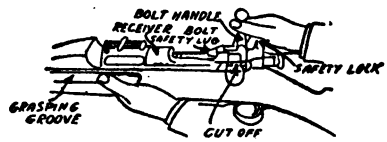


Fig. 23, C—The U. S. Springfield Rifle (How the Bolt Action Works).

tries. The end of the barrel is fitted to receive a bayonet or short sword.

The British government uses the *Lee Enfield* rifle. It has a total length of 4 feet, weighs 9 pounds, and shoots 10 cartridges without reloading. It shoots a lead bullet with a cupro-nickel jacket, and has a muzzle velocity of 2,060 feet per second. The cartridge is a .303-caliber, shoots smokeless powder, and the gun is sighted to 2,800 yards.

The *French* army rifle is the *Lébel;* it has a total length of 4 feet and 4 inches, and weighs 9 pounds. The magazine holds eight .315-caliber cartridges which are loaded with copper bullets having a copper-zinc alloy jacket. It is sighted to

2,620 yards and has a muzzle velocity of 2,310 feet per second.

The German army rifle is the *Mauser;* it has a length of 4 feet and weighs 8 pounds. It shoots a .311-caliber soft lead, nickel-steel alloy jacketed bullet and the magazine holds 5 cartridges. Its muzzle velocity is 2,960 feet per second and its sighted range is 2,187 yards.

Italy uses the *Paravicino-Carcano* rifle; Russia the *three-line* rifle and Japan the *Arisakae.* The military rifles of all of these countries use high-power cartridges charged with smokeless powder, and for this reason one gun is just about as good as another.

CHAPTER IV

THE GUN FOR THE BOY

ALL through the foregoing chapters I have told you how to make things to shoot with from a sling to a crossbow, and now I want to tell you about a boy who made his own gun.

And you could make one too, and even easier than he did, for he lived a long time ago when tools were poor and scarce, but in these days of great machine shops it is cheaper and safer for you to buy a gun already made.

The Boy Who Made a Gun.—He was an American boy who lived at Ilion up in New York State just one hundred years ago (1817). His name was Eliphalet Remington, and while you may never have heard his first name before you will hear his last name wherever a gun is used, and this was the chap who wanted a gun so badly he vowed he'd make one.

You, of course, will wonder why he didn't go to a sporting goods store and buy one, even as you and I, but the answer is that the only guns which could be bought at that time came from Europe,

and they were so all-fired costly he couldn't afford one, and so the only thing he could do was to make one, and this is the way he did it.

His father was a blacksmith as well as a farmer, and young Eliphalet, when he wasn't growing things on the farm, was making things in the shop. When the idea of making a gun hit him, it hit him hard and he worked at the forge until he had hammered the barrel of a rifle out of the best steel he could make, for there was no ready-made steel in those days.

When he had forged the barrel he walked to Utica, where he had it bored and rifled and a lock fitted to it; then during the next couple of months he fashioned a stock of black walnut, a slow and tiresome job for a boy, but he stuck to it and after much hard work he finally finished it and fitted it to the lock and at last *he owned a gun.* (See Frontispiece.)

And How He Killed a Bear.—Those were wild and woolly days around Ilion a century ago, and the hills about his home were fairly alive with game, both small and large. He loaded his rifle with a heavy charge of powder and a bullet, not in quest of a squirrel—no, siree—but to bag a deer.

Now, a deer does not always come to him who

hunts for it, but in his case a big, brown bear who was out in the early morning seeking her breakfast sighted young Remington first and she made for him. The boy was a crack shot and good was his home-made gun; hence woe unto the bear. When he returned home the young gunmaker was dragging the bear after him, all of which was proof enough that he was not only a Yankee genius with tools, but *some* hunter as well.

Well, when the neighbors found out what the youngster had done they wanted guns just like his, and it was not long before the boy and his father set up a real shop on a nearby creek so that they could have water power. This was the beginning of the Remington gun, and now after one hundred years it is still going strong.

The Gun that is Made for You.—While this early American rifle was made by a boy still it was a man's gun in weight and size; and it was not so very long ago that if a boy shot at all he had to use a man's gun.

But of late years all this has been changed, and the makers of guns have woke up to the fact that if they made a gun especially for the boy of today and got him interested in shooting they stood a pretty good chance of selling him guns and ammunition tomorrow when he grew up.

And the gun manufacturers guessed about right, and so nearly all of them make a boy's rifle now that is at once light in weight, shoots cheap ammunition, and is as powerful as it needs to be while its first cost is indeed very small. For these reasons the rifle known as a .22-caliber—and there is quite a family of them—has become very popular with boys the world over.

For target-shooting you can't beat a .22 rifle, as there is no *kick* to speak of and this does away with the natural tendency which most beginners have of flinching when the gun is fired. But the .22-caliber gun is more than a mere target gun, for it is just as effective to shoot small game with, such as squirrels, rabbits, etc., when it is in the hands of a good shot as a rifle of larger caliber and which uses more expensive ammunition.

Besides these good features the .22-caliber is a safety gun in the sense that its range and penetration is nowhere nearly as great as in rifles of larger caliber with one exception, but this is another story which I shall tell you about later. Anyhow, the .22-caliber rifle is the gun that is made for you, so buy one and be glad.

The Family of Boys' Guns.—When you get ready to buy a gun you will very likely be surprised to find that there are a dozen different

makes as well as several kinds on the market, and you will, of course, want to know which one is the best.

Now, guns are very like clothes and automobiles and other things in that if you buy a well-known make with a reputation behind it you will get full value for your money. Each one of the guns which I shall describe is a good gun—or I should not tell you about it—and all you have to do is to pick the one that suits your fancy and the contents of your pocketbook and you will have the right gun.

The Remington Boys' Rifles.—The Remington people make two styles of rifles which are especially adapted for boys just about your size and age.

The Single-shot Rifle.—The first is known as their *No. 6 single-shot take-down rifle* and of course it is a .22-caliber gun. (See *A*, Fig. 24.)

If you are a beginner it is a good gun for you to have because until you have learned how to handle and care for a gun a higher priced one is really an extravagance. The *No. 6* has a 20-inch round barrel which I dare say is made of far better steel and more accurately bored and rifled than the original Remington—but alas and alack-a-day! there are no bears hereabouts, and that's where Eliphalet had the best of it.

Waking up again, the barrel of the *No. 6* is of the best steel, the *frame* is forged and *case-hardened,* and the stock and fore-end are of turned walnut. The working parts of the lock are of forged

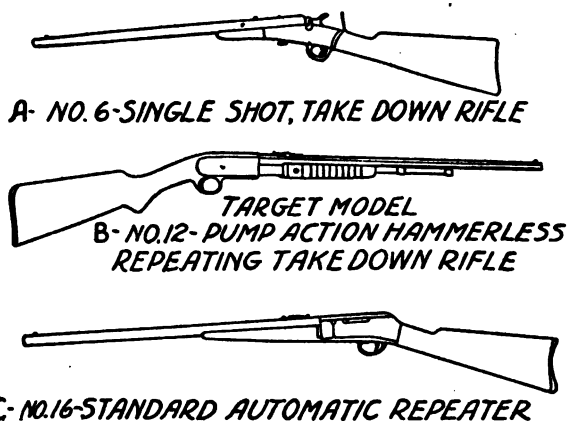


Fig. 24—The Remington Family of .22-Caliber Rifles.

steel and the butt of the rifle is fitted with a steel butt-plate.

This rifle is provided with a *leaf rear sight* and a *bead front sight* and in addition a *long peep sight* is attached to the *tang* of the rifle, the use of which is described in the chapter on *How to Be a Crack Shot.* It is chambered to take the following am-

munition: *BB* and *CB caps, .22-short* and *.22-long* cartridges, which are described in the chapter on *Powder and Shot and Shell.*

The rifle can be taken apart, hence it is called a take-down rifle, by means of a thumbscrew, and this is a great convenience in cleaning as well as in carrying it about when not in use. It only weighs 4 pounds and it costs but $4.55.

The Repeating Pump-Action Rifle.—Another kind of Remington rifle is designed for target-shooting. It is a repeating, hammerless, pump-action gun with a 24-inch octagon—that is, eight-sided—steel barrel having a 16-inch *twist,* which means the spiral formed by the grooves. (See Appendix D.)

The stock, which is made of walnut, is fitted with a pistol-grip, and this will help you to shoot straight. The magazine is of the tube type, is placed under the barrel, and holds fifteen *short,* twelve *long* or eleven *long rifle* .22-caliber cartridges. It weighs about 5½ pounds and costs $18.10. It is shown at *B,* Fig. 24.

The Auto-Loading Rifle.—Should you prefer to have an auto-loading .22-caliber rifle—and of course you will prefer it if you have the money to buy it with—you can get a fine gun of this kind of Remington make, as shown at *C,* Fig. 24,

with a 22-inch round steel barrel which weighs only 5¾ pounds at a cost of $23.70.

The Winchester Boys' Rifles.—The Winchester Repeating Arms Company makes several different models of .22-caliber rifles, and all of them have been very popular.

The Single-shot Rifle.—The Winchester Model 1902 single-shot take-down rifle, shown at *A*, Fig. 25, will shoot .22-short, .22-long or .22-long rifle cartridges. The action of this rifle is of the *bolt type;* it is very simple and has very few parts. The barrel is 18 inches long, and it has a combination trigger-guard and pistol-grip with polished stock and rubber butt-plate. It only weighs 3 pounds and costs $5.50.

This company also makes a *thumb-trigger single-shot* rifle in which the trigger is placed on the upper side of the grip at the rear of the bolt, and it is worked by simply pressing it down with the thumb. Its cost is only $4.50. The Winchester Model 1904 *take-down single-shot* rifle has a 21-inch heavy barrel and costs $7.25.

The Repeating Pump-Action Rifle.—The .22-caliber Winchester *pump-action repeater* (see *B*, Fig. 25) has been the favorite shooting gallery gun for years. Its action is shown at *A* and *B* in Fig. 20. It has a 24-inch octagon barrel and a

tubular magazine which shoots fifteen .22-short, twelve long, or eleven long rifle cartridges. It weighs 5 pounds and costs only $17.50.

The Automatic Rifle.—This is a 10-shot self-loading hammerless take-down rifle, and you will get a mighty fine gun if you can afford to pay as much as $27.00. The magazine in this rifle is in the stock, and it is filled through an opening in the

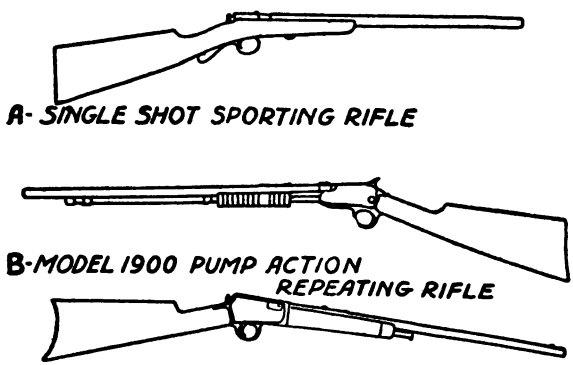


Fig. 25—The Winchester Family of .22-Caliber Rifles.

stock after the magazine tube is pulled back. It weighs 5¾ pounds and is shown at *C* in Fig. 25.

The Marlin Boys' Rifles.—The Marlin Arms Corporation does not make any single-shot rifles, but I can testify to the excellence of their repeaters.

The Repeating Pump-Action Rifle.—This rifle is very like the Winchester just described, except that it has a solid top side ejector and a closed-in frame. It handles the .22-short, .22-long, and long rifle cartridges. *Model 29* weighs 4¼ pounds and costs $12.00, while *Model 20* weighs 4¾

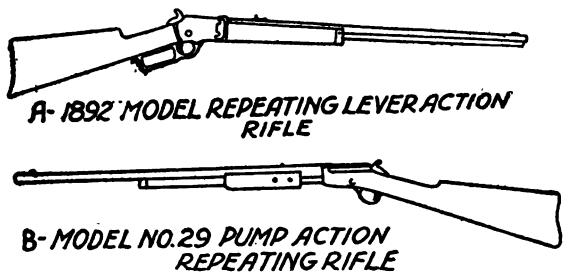


Fig. 26—The Marlin Family of .22-Caliber Rifles.

pounds and costs $14.00. Model 29 is shown at *B* in Fig. 26.

The Repeating Lever-Action Rifle.—This company also makes a *lever-action repeating* .22-caliber rifle known as the 1892 Model. It weighs 5⅜ pounds and costs about $15.00. As I have used a Marlin Model 1894 .44-40-caliber carbine with lever action for several years I am partial to this kind of a gun. It is pictured at *A* in Fig. 26.

The Savage Boys' Rifles.—From the title you may think I mean that these guns are for savage

boys but nay, nay—they are only for good little boys like you and me, and, let me whisper this, the Savage Arms Company is turning out some of the finest guns that have ever been made for boys.

The Single-shot Rifle.—This company makes a single-shot rifle, and this is known as *Model 1905 target rifle.* It has a 22-inch round barrel, weighs 4 pounds and 12 ounces, and costs $6.50. It has a bolt action as described in the last chapter under the caption of *Military Rifles.* *A,* Fig. 27, is an illustration of it.

The Repeating Pump-Action Rifle.—The Savage folks also make two styles of .22-caliber *pump-action* repeaters. The first style (see *B,* Fig. 27) is made with a *box magazine,* the construction of which was described in *Chapter III.* It shoots seven shots, weighs 5½ pounds, and costs $14.00.

The *tube* magazine repeater holds twenty .22-caliber short, seventeen long, or fifteen long rifle cartridges. This gun weighs 5¾ pounds and costs but $16.00.

The Automatic Rifle.—A featherweight, self-loading .22-caliber rifle is also made by this company. It weighs 4¾ pounds and costs $12.50. It is shown at *C,* Fig. 27.

The Stevens Boys' Rifles.—The Stevens Arms

Company makes a good line of moderate-priced .22-caliber rifles.

The Single-shot Rifle.—Their single-shot rifles are very good, especially *models No. 12,* called the *Marksman,* and *No. 26,* called the *Crack Shot,* are good guns for target-shooting. The former

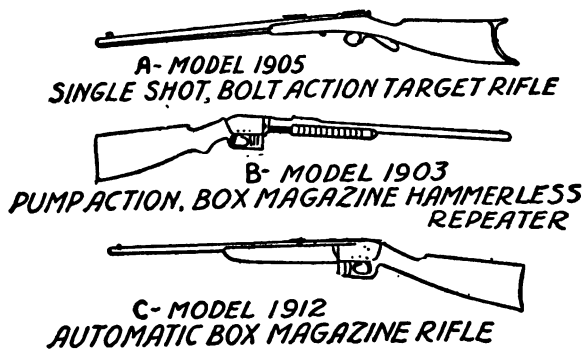


Fig. 27—The Savage Family of .22-Caliber Rifles.

weighs 4 pounds and costs $6.50, while the latter weighs 2¾ pounds and costs $4.75. It is pictured at *A,* Fig. 28.

The Pump-Action Repeater.—The Stevens *visible loading pump-action* rifle, as shown at *B,* Fig. 28, is something new in repeaters. The magazine tube and the breech-block are made in one piece and the cartridge is always in sight while it is being

fed into the chamber. The gun weighs 5 pounds and costs about $12.00.[1]

Shotguns for Boys.—Trap-shooting—that is, shooting clay birds thrown into the air by means of a trap—is the finest sport of the day, and if you

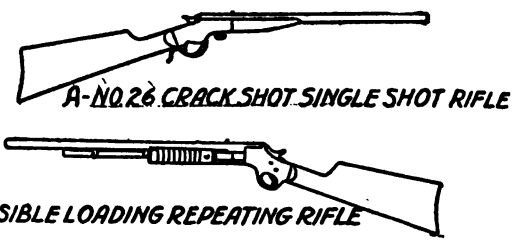


Fig. 28—The Stevens Family of .22-Caliber Rifles.

are a real live boy you will certainly want to get in on it.

Until a few years ago the cost of a good reliable shotgun, its great weight, and the cost of the ammunition prevented a boy from indulging in this up-to-date sport, but now with a very moderate outlay you can get a good, cheap and light gun.

Now, a shotgun is different from a rifle in that it shoots a *shell* which contains a number of shot and this gives you a better chance of hitting your target than with a rifle. The barrel of a shotgun

[1] The prices given in this chapter are correct at this writing but are subject to change.

has a much larger bore than that of a rifle (see Appendix G) and it is also longer. The charge of powder in the cartridge is also larger and more powerful than that used in a rifle cartridge, and yet to make it light enough to use the barrel must be made of thinner steel than that of a rifle. For this reason you should be sure to buy an A1 high-

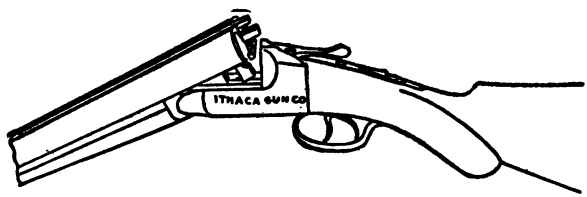


Fig. 29—The Ithaca Double-Barreled 20-Gauge Shotgun.

grade shotgun, for there is always danger in using a poor, cheap make.

There are so many makes of good guns on the market that it would be impossible for me to describe all of them here, but I will say this, that $25.00 is the least that you can buy a good double-barreled shotgun for of any make.

Shotguns are made in different bores, or *gauges,* and these are 10, 12, 16, 20 and 28; the 10-gauge gun is the largest and most powerful and the 28-gauge gun the smallest. The 12-gauge gun is the size most generally used by sportsmen, but it is

too heavy and the recoil is too great for a boy to do accurate shooting with it. Instead, my boy prefers a 20-gauge Ithaca double-barreled gun, as shown in Fig. 29, as it is safe, light and inexpensive, and it will just fit you too.

Although it shoots only two-thirds as many shot as the 12-gauge gun and weighs much less, the pattern is just as large and the penetration is just about the same. Owing to its light weight—5½ pounds—and the light weight of the ammunition used in it you can get into action with this gun one-fifth of a second quicker than with a 12-gauge gun, and this is a great advantage, as some birds fly 20 feet in this length of time.

So you see that while the number of shot in the shell is not so great as in the shell of the 12-gauge gun, still you can hit your flying bird 20 feet nearer, and this more than makes it the equal in power of the larger gun. Taken all around, the Ithaca is an ideal gun for a boy, and I have found it equally good for myself.

CHAPTER V

GUN SAFETY FIRST

IN the wild old days when Davy Crockett, Colonel Jim Bowie—he of *bowie knife* fame—Daniel Boone and other pioneers just as brave were exploring and settling the wilderness that lay to the west of the Alleghany Mountains there was one gun at least in every family and sometimes every member, including the boys and the girls, had one of his or her very own.

When Every Boy Could Shoot.—The long-barreled rifle of the pioneer was often his sole means of obtaining meat, and what was of even greater importance it was his weapon of defense against not only wild animals but marauding Indians and the equally bloodthirsty white *renegades.*

To enable him to live up to *the first law of nature,* which *is self-preservation,* every boy was trained to shoot and to shoot straight just as soon as he was able to lift the heavy rifle and aim it. Then when his father was called away from home by his work the boy became the protector of and provider for the family, and his ability to do

both of these things depended on his skill as a sharpshooter, and if you are a bred-in-the-bone American boy you have in the very nature of things inherited the quick draw, the sharp sight and the steady nerve of your hardy forefathers—and so you ought to make a crack shot.

Gun Accidents in the Early Days.—In those early days, and for a long time after, there were lots of accidents, and these were caused not so much by carelessness in the use of a gun, for every boy was taught the *ethics* of shooting—which means the right way to handle a gun with regard to the safety of himself and others—but because the art of making guns was new, and every now and then one exploded and did other things that a good gun should not do.

Still no one ever thought of such a thing as keeping a boy from learning to shoot, for it was the lesser of two evils—that is, the boy's folks would rather take a chance on a good gun going bad than on a bad Indian getting good; and hence he very quickly learned how to take aim and fire at any and every thing which he could skin and eat or which, turn about, might eat him skin and all.

How Guns are Now Made Safe.—After a hundred years of experimenting the guns of today have been perfected to such an extent that those

turned out by any reputable maker are not liable to explode nor will they go off prematurely if you do your part.

The Steel the Barrels are Made Of.—Where barrels in the long ago were made of two or more

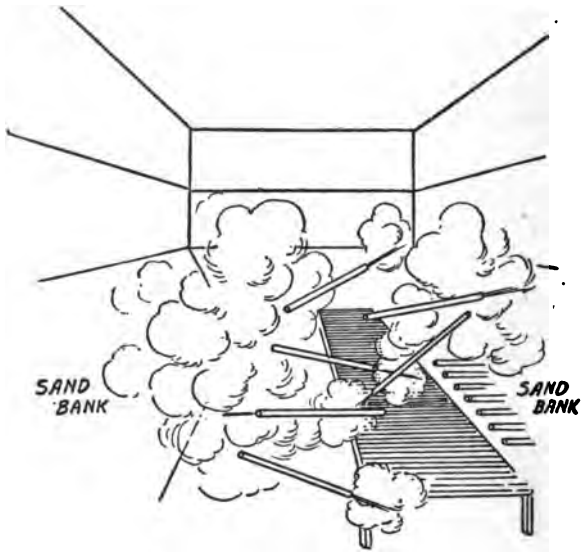


Fig. 30—How Gun Barrels Are Proved.

pieces of steel welded together they are now made of a single solid piece of *Krupp, Damascus, stub twist, vanadium* or other high-grade steel.

How the Guns are Proved.—To *prove a gun* means to test it, and one of the ways that makers

do this is to load the barrel with a charge heavy enough to break any but the very best; it is then sent to the *firing-room,* where it is laid in a groove on a rack with its muzzle pointed toward a sand-bank, as shown in Fig. 30.

Then the charge is exploded, and if the barrel is without a flaw it will come out unscathed. It is then taken into another room, washed out and carefully inspected, and if it is O. K., it is next subjected to a water pressure of 600 pounds to the square inch, and if there is the slightest defect in the barrel it will burst. These tests are called the *provisional proof.*

After these tests are made each barrel is drilled to the required caliber and rifled, or it is bored to the proper gauge, depending on whether it is a rifle or a shotgun, and it is then fixed to the breech-action. It is ready now for the final test, which is called the *definative proof,* that is, the gun is loaded and fired again.

In this proof if the action shows any weakness it either gapes at the breech or else it is blown to pieces. After these tests when the gun reaches you you may be sure that it is as nearly 100 per cent proof against exploding as it is possible to make it. In the old-time guns the different parts of the receiver and other parts were *brazed* together while

now they are made of the finest quality of *drop-forged tool* steel.

Other Safety Improvements.—Besides the great improvements in the various parts of the gun of today due to the wonderful advances in making high-grade steel the gun manufacturer has picked the brains of the greatest inventors for other ideas of safety for the last half-century, and the big manufacturers have vied with each other in recent years to see who could make the safest gun, with the net result that every one now turned out is as safe as it can be.

The Hammer at Half-cock.—Next to using the finest steel for the barrel and the receiver, nearly all the other schemes for safety have to do with preventing the gun from accidentally going off before you are ready to pull the trigger.

The greatest safety device ever put on a gun dates way back to the time of the flintlocks and this is the *hammer at half-cock*—a position midway between the hammer when it rests on the cartridge or shell and when it is at *full-cock,* that is, pulled clear back.

When the hammer is at half-cock the *sear,* which is the piece that holds the hammer at half-cock, holds the hammer in place so that it cannot by any hook, slip or crook be pulled down either acci-

dentally or on purpose, and the only way to shoot the gun is to draw the hammer back to full-cock. Fig. 31 shows the hammer at half-cock.

Safety in Repeating Rifles.—In repeating rifles safety is obtained by so constructing them that the hammer cannot be pulled down by any possible

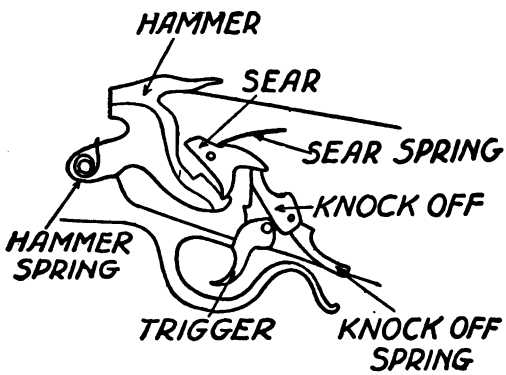


Fig. 31—The Hammer at Half-Cock.

chance while the action is open, and different makers use various means for getting this result.

In the Marlin repeating rifle the *firing-pin* is cut in two and when the action is *open* and you are loading the gun the front end of the rear piece of the firing-pin drops into a slot in the breech-bolt and when it is in this position the gun cannot possibly be discharged.

The Winchester and Remington repeating rifles have what is known as a *safety-catch,* and when the action is *open* and you are loading the gun the catch prevents the trigger from being pulled and of course the hammer cannot strike the firing-pin.

Very nearly all the .22 hammerless guns that are now made are provided with a safety slide-button which is set directly in front of the trigger and under the gunner's thumb. This safety button locks the trigger, and you cannot pull the latter until you release it again. This provides a safety device which is just as efficient as the half-cock of the visible hammer guns.

The makers of guns have weeded out every chance for an accident to happen in so far as the construction of the gun is concerned, and if then an accident occurs it is dollars to doughnuts that it was caused by your carelessness and not by any fault of theirs.

Yes, while nearly every accident can be traced directly to the carelessness or the ignorance—which is just as bad—of the gunner, yet the fault may not alone be his, for he may never have been told or shown the right way to handle a gun.

But since " ignorance is no excuse in the eyes of the law " it is strictly up to you to learn how to handle a gun in a safe and sane way, and you will

not only live to a ripe old age but you will let others live their allotted threescore and ten, that is, if the doctors don't decide otherwise.

Rules for Safety in Handling Guns.—*Rule No. I.*—The very first and most important rule for you to know and to live up to is to *never under any circumstances point a gun, whether it is loaded or not, at any one.* Many a person has been killed by an idiot who pointed a gun at him, playfully pulled the trigger and then tried to justify his terrible mistake by saying *he didn't know it was loaded.*

Rule II.—Never point a gun at anything which you do not intend to shoot at.

Rule III.—Never load your gun while any one is in front of you, and it naturally follows that you must never stand in front of any one who is loading a gun.

Rule IV.—Always keep your face away from the muzzle of a gun, for it has no business there. There is only one end of a gun barrel that it is safe to look through, and that is the breech end.

Rule V.—A bad habit that some beginners get into is to cock and pull the trigger for fun. This is bad for two reasons, and these are: (1) *because the gun might be loaded* and (2) because if the gun is unloaded the whole mechanism of the action is needlessly worn and may be strained. If for

any reason you should want to try the action of a gun put an empty cartridge in the firing chamber and then try it out.

Rules for Safety in Loading a Gun.—After letting these rules sink through the porous clay of your cranium it is time for you to learn how to load your gun safely.

Rule VI.—In loading your gun hold it so that *the muzzle of it points toward the ground* and about a yard away from your feet.

Rule VII.—If you are loading a single-shot gun *set the trigger at half-cock,* open the breech, and then slip in a cartridge. Close the breech and *let the gun stay at half-cock* until the moment before you are ready to aim. By following this rule the cartridge simply can't go off accidentally.

Rule VIII.—The moment you have pulled the trigger and the hammer has hit the firing-pin and exploded the cartridge pull the hammer back to half-cock.

The only time when a gun should be at full-cock is at the instant of firing; at all other times the hammer should be at half-cock, or *safety,* as it is called.

Rule IX.—(*a*) All repeating guns are of course at full-cock when you have worked the action for the purpose of reloading them. Unless you are

Fig. 32, A—How to Carry a Loaded Gun (Sportsman's Style).

shooting one shot rapidly after another do not leave it at full-cock. (*b*) To set a repeater at half-cock grasp the hammer firmly with the thumb and gently pull the trigger with your *index,* or *trigger* finger; hold the hammer tight and let it down from full-cock to half-cock. This operation should be practiced with an empty gun until you have the knack of it down fine.

Rules for Safety in Shooting a Gun.—Even the best ammunition has its faults and small-caliber cartridges are far more apt to miss fire than those of larger calibers.

Rule X.—(*a*) If when you pull the trigger the cartridge does not explode, the chances are that it won't go off even if the trigger is pulled the second time. (*b*) Never take the cartridge out of the gun at once if it has failed, as it may be *hanging fire* and if you do it may explode in your hands a couple of seconds later.

Rule XI.—(*a*) Bear in mind that the extreme range of a .22-caliber cartridge is about 1,300 yards and when you are shooting at a mark always remember that if you miss it the bullet will travel ¾ of a mile, and you never can tell who or what is between your mark and the place where the bullet lights.

(*b*) The safest way to shoot is to either aim so

Fig. 32, B—How to Carry a Loaded Gun (Military Style).

that the bullet will hit the ground a few feet *back* of the target or else give it enough *rise* so that it will spend its power in the air. Of course if there is a deadstop back of the mark you are shooting at you need not heed this last rule.

How to Carry a Loaded Gun Safely.—When you are carrying a loaded gun, as for instance when *roving*—that is, going across country and shooting at various marks as you come to them—or when hunting, note the following safety rules.

Rule XII.—The safest way to carry a gun is to hold it in your hand by the *balance,* or middle of the rifle, that is at the action allowing the *comb* of the stock—that is, upper edge of it—to rest against your armpit and with the barrel projecting out and down in front of you, the whole gun being at such an angle that should it go off accidentally the bullet would hit the ground 3 or 4 feet in front of you, as shown in Fig. 32.

The military style of carrying a gun is to rest it on your right shoulder, or at *shoulder arms* as it is called, and this way is shown in Fig. 33. The butt is grasped in the right hand and the gun is held at an angle of about *45 degrees,* so that the barrel points well up toward the sky, and this is also a safe way.

Rule XIII.—Never carry your gun loaded unless

you are hunting, and then always carry it at half-cock. If your gun is at full-cock and you should slip up or fall down or stub your toe and something should strike the hammer the gun might be discharged and you or your shooting partner or some one else would be very likely to get hurt.

Rule for Owning a Gun.—*Rule XIV:* Before you ever use a gun study these rules until you know them upside down and can say them backward and then *heed them* to the letter. If you do you will always be on the safe side, and if you don't you haven't got the right kind of sporting blood in you and you should never be permitted to own a gun, much less allowed to shoot one.

CHAPTER VI

POWDER AND SHOT AND SHELL

IF you will jog your memory a little and hark back to the *Invention of the Gun* you will be able to conjure up a picture of the hunter who carried his powderhorn, or flask, his bullet pouch, paper for the wads and a ramrod, besides his gun, whenever he went a-shooting.

Bother was the front name of the old-fashioned muzzle-loading gun, and to make more trouble, if such a thing was possible, after carrying along all these trappings the shooter wasted a lot of his precious ammunition every time he loaded up; besides, no matter if a bear or an Indian was right on his heels there was no such word as *hurry* in his old dictionary of getting ready to blaze away the second time.

When the Cartridge Came Into Use.—With the coming of the *metallic cartridge*—that is, a metal shell in which the fulminate is placed in the closed end, or head, with the powder on top of it and the bullet set in the open end—all the old-time bother and trouble of the ramrodders ended,

though they did not end at once because the new ammunition and the guns to use it in were very costly.

The metallic cartridge first saw the light of day in 1831 and the credit of its invention is due to the French. After its introduction over there it was several years before it was brought to the United States, and as late as Civil War days the boys in blue and gray used a scheme just a notch ahead of the ancient powderflask and bullet pouch. It consisted of a paper, or linen cartridge, which carried the exact charge in it and one end of which the soldier was supposed to tear off with his fingers, but which he found it easier to bite off with his teeth just before loading his musket.

Shortly after the war was over the first metallic cartridges came into use in this country, but even then it was a long time before they became popular because, as I have pointed out above, both the cartridges and the breech-loaders for shooting them were so expensive. Still rich sportsmen had them and a demand was thus created which was a step in the direction of making them cheaper.

The Coming of the Minié Bullet.—About the year 1845 a French inventor named Minié made another improvement, and this time it had to do with so small a thing as the shape of the bullet, but

which is a mighty factor in its flight, as we shall see a little further on.

A hundred years before the Minié bullet was invented it had been found that rifling the barrel would give the bullet a rotary motion, that is it makes it spin round on its *long axis* and literally bore its way through the air, and this action caused it to shoot farther, straighter and with greater power than when it was shot from a smooth-bore gun.

Up to Minié's time the bullets had always been made round, but this inventor produced a bullet of the shape as it is used today—that is, the front end is *conical,* the body is *cylindrical* and the rear end is flat.

Now, this new style of bullet was a great improvement on the old round bullet, for it offered much less resistance to the air and besides it was considerably heavier than a round bullet of the same caliber. When this bullet was shot from a rifled barrel it showed not only a higher velocity, that is, the number of feet it travels in a second, or speed, but that it had a carrying power of nearly twice the distance.

The Pin-fire Cartridge.—One of the first kinds of metallic cartridges made was known as the *pin-fire* cartridge, and since it was formed of a metal

shell it was called a *metallic cartridge,* a name that is used to this day.

In the closed end of this cartridge a firing-pin was fixed and the fulminating powder covered this pin on the inside of the shell; then the powder was put in and on top of this the bullet was set and held in place by the pressure of the open rim end of the cartridge. When the hammer of the gun struck the pin of the cartridge it exploded the latter and sent the bullet whizzing on its way.

Rim and Center-fire Cartridges.—While the pin-fire cartridge was a wonderful improvement in gunnery and a far cry in advance of anything else that shooters had ever used before, still there was lots of room for the inventor to show his ability and to reap the reward—if some one else did not reap it for him—for the new-fangled pin-fire cartridge nearly cost its weight in gold to manufacture and what was wanted was a cartridge and a breech-loading gun which were cheap enough so that every shooter could afford to have and use them.

And soon the long-haired inventor came forth from his attic workshop and he brought with him a gun—a gun that had the firing-pin in the breech-block and a cartridge with a solid back and he was crowned with laurel and honors were heaped

upon him, and let us hope he also made a lot of money out of his clever invention.

Now, there are two kinds of cartridges, and these are known as (1) *rim-fire* cartridges and (2) *center-fire* cartridges.

The Rim-fire Cartridge.—In the rim-fire cartridge the primer is set in the rim of the cartridge as shown at *A* in Fig. 33, and the firing-pin of the

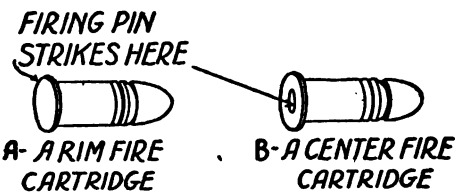


Fig. 33—Rim and Center Fire Cartridges.

gun strikes the rim hard enough to put a dent in it and this explodes the fulminate.

Nearly all .22-caliber rifles are made to use rim-fire cartridges, as this is the cheapest ammunition that can be bought. There are .22-caliber rifles that use center-fire cartridges, but a rifle that shoots a rim-fire cartridge will serve your purpose just as well.

The Center-fire Cartridge.—A center-fire cartridge (see *B,* Fig. 33) is made in just about the same fashion as a rim-fire cartridge, except that

the primer is set in the center of the head of the shell and it is there that the firing-pin of the rifle strikes.

Nearly all makes of American rifles now on the market except the .22-calibers shoot center-fire cartridges as these are more certain in their action.

Shotgun Shells.—Cartridges may be further divided into (1) those that are shot in a rifle and (2) those that are shot in a shotgun, and this latter kind are called *shells,* whether they are loaded or unloaded.

While a cartridge has a primer and is loaded with powder and a bullet as we have seen above, the shell for a shotgun has a primer that is fixed in what is called a *battery-cup;* next a charge of powder is put in the shell and two or three wads of felt are forced down on top of the powder.

The shot is then poured in on top of the wads, a cardboard wad is put on top of the shot and the shell is *crimped,* that is turned down to hold the last wad in place. All shells for shotguns are of the center-fire kind. A shotgun shell cut in two is shown in Fig. 34.

Now, there are two kinds of shells used, namely (*a*) those in which the shell proper, or containing case, is made entirely of brass, and (*b*) those in which the head of the shell is made of brass and

the case is made of paper. The paper shells are just about as good if they are handled carefully and are very much cheaper.

About Reloading Shells.—Both kinds of shells can be reloaded, but it is safer and better in every

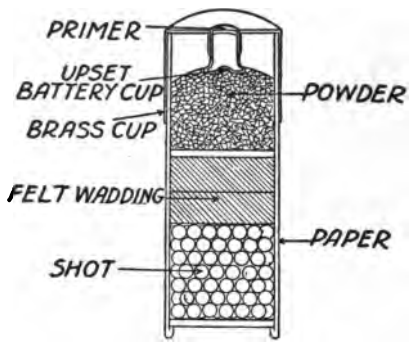


Fig. 34—Cross-Section View of a Shotgun Shell.

way for you to buy your ammunition ready-made instead of preparing it yourself unless you are an experienced shooter, and then you may have ideas of your own on the subject.

Powder for Cartridges and Shells.—There are three different kinds of powder used for loading rifle and shotgun shells, and these range from a fine grain to a coarse grain and from black to smokeless.

Ordinary Black Powder.—For some cartridges

black powder of various sizes is used. The finest grain powders are made for pistols, revolvers and rifles having very small calibers, while the coarser grain powders are used for large-caliber rifles.

Semi-smokeless Powder.—This is a dead, bluish-black powder and is better than ordinary black powder in that it gives a greater degree of accuracy, produces less *fouling,* has a higher velocity, and generates less heat. For these reasons it is used almost altogether for rifle cartridges.

The different size grains of semi-smokeless powders are lettered as follows: FFFFG for the finest grains, and this is the kind that is used in .22-caliber rifles; the FFG size is used for .32-caliber rifles, and the FG and the CG sizes are used for the larger calibers. The smaller grain powders should never be used for large-caliber rifles because bulk for bulk they are much more powerful than black powder, and to insure safety the right size of powder must be used in a cartridge of a given caliber.

Smokeless, or Nitro Powder.—This is the powder that nearly all sportsmen prefer. There are two kinds of smokeless powder made, and these are known as (1) *bulk-for-bulk* and (2) *dense* powder. (See Appendix II.)

Bulk-for-bulk, or simply *bulk* for short, means a powder whose charge, or explosive power corre-

sponds very nearly when an equal bulk is used as black powder although the smokeless powder weighs much less, while *dense* powder is one which equals the strength of a black powder charge but whose bulk is much less.

The following trade names are given to bulk powders for use in shotgun shells, and when you buy shells loaded with them you will know to a certainty that they can be depended on; these powders are (*a*) Du Pont; (*b*) Schultze; (*c*) E. C. Hazard and (*d*) Empire. Dense powders of reliable make are the *Infallible* and *Ballistite*.

Ammunition for .22-Caliber Rifles.—And now a few words about ammunition for the family of .22-caliber rifles which we talked about in the chapter before this one. There are many makers of ammunition, and of course all of them make .22-caliber cartridges, but those that I know from experience to be good ones are the Peters, Remington, Winchester and U. S. Cartridge Company.

Kinds of .22-Caliber Cartridges.—Of course all .22 cartridges have the same diameter, but five different lengths are made. These various sizes are (*a*) the *BB*, (*b*) *CB*, (*c*) *short*, (*d*) *long* and (*e*) *long rifle* cartridges, all of which are shown full size in Fig. 35.

All of these cartridges are charged with either

black, semi-smokeless or smokeless powders as you want them. The short, long and long rifle cartridges are also made with (*a*) solid bullets or with (*b*) hollow bullets.

The BB caps, as these little cartridges are called, are used in nearly all of the shooting galleries where the range is only 50 feet; they should never be used in a gun that has a rifled barrel. The short

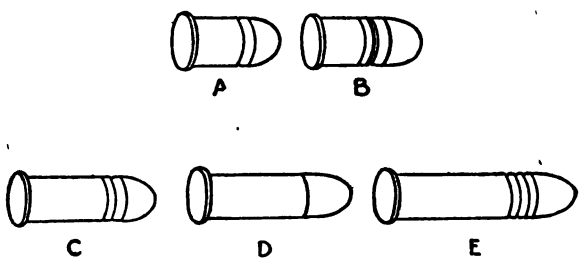


Fig. 35—Kinds of .22-Caliber Cartridges.

and long cartridges are plenty good enough for target-shooting at close range, but for all-round shooting you will find the .22-long rifle cartridge loaded with semi-smokeless powder and a solid bullet as good as the best.

The .22-caliber long rifle cartridge carries a bullet that weighs 40 grains and it has a *muzzle velocity*—that is, a speed as it leaves the barrel—of 970 feet per second, an accurate range at from

100 to 200 yards, and a penetration of five 7/8-inch pine boards. The different kinds of .22-caliber bullets are shown in Fig. 36.

Shot Cartridges for Rifles.—In order that shot can be fired in a rifle instead of a single bullet so

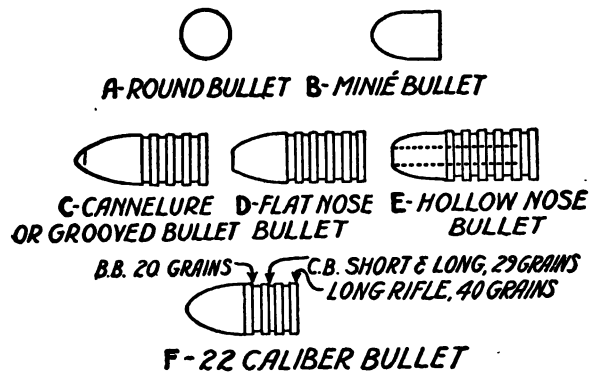


Fig. 36—Kinds of .22-Caliber Bullets. Arrows show weights of BB, CB, Short, Long and Long Rifle Bullets.

making it easier to hit a mark *shot cartridges,* as they are called, have been put on the market.

Shot cartridges to be used in a .22-caliber rim-fire rifle are made in two sizes, and these are (1) BB caps and (2) longs, the first being charged with black and semi-smokeless powders only, and the second can be had charged with either black, semi-smokeless or smokeless powders. They are

loaded with No. 12 shot encased in a thin covering of cardboard as shown in Fig. 37.

About Buying Ammunition.—*Cartridges:* You will find it much cheaper to buy at least a thousand cartridges at a time. The price of .22-caliber long rifle cartridges is about $6.00 per thousand.

Shells.—Shells for the 20-gauge shotgun are loaded with either black, semi-smokeless or smokeless powders, and are loaded with shot ranging from 1 to 10 and BB.

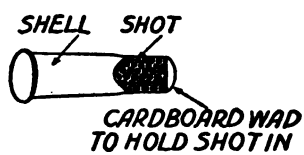


Fig. 37—.22-Caliber Rim-Fire Shot Cartridge.

I have found that a 2½ - inch smokeless powder shell using 18 grains of *dense* powder—*Infallible* preferred—and carrying ⅞ ounce of No. 8 shot to be a good all-round shell. They cost about $17.25 per case of five hundred.

A cheaper shell which will do good work is the *Referee* brand made by the Peters Cartridge Company only. It shoots semi-smokeless powder and is the only reliable shotgun shell using this kind of powder that I know of on the market.

For a little 20-gauge gun use a 2½-inch shell loaded with 2½ drams of semi-smokeless powder which carries ⅞ ounce of No. 8 shot. These

shells, though much cheaper, compare very favorably with smokeless powder shells. They cost $12.25 per case of five hundred.

I never use black powder cartridges if I can help it because they foul and heat the barrels so quickly.

Shot Cartridges for Rifles.—The BB shot cartridges for rifles which I described a ways back cost about $8.00 per thousand; the long black powder cartridges cost $11.00 per thousand; the semi-smokeless $11.00 per thousand and the smokeless $12.50 per thousand.

CHAPTER VII

THE FLIGHT OF A BULLET

KNOWING now how your gun is built and how it works, and having learned how a cartridge is made, the next thing you should find out is what happens when there is a cartridge in the firing chamber and you pull the trigger.

Of course you will say that the powder shoots the bullet out of the cartridge, on through the barrel, and thence through the air until it hits the mark, or is stopped by hitting something else. And while all of this is true it is only a very small part of the truth, for there are a lot of things that take place between the first impulse of the bullet and its impact against the target.

The flight of a bullet from the powder to the target is called the *ballistics* of shooting, and this scientific word means simply that all of the forces inside of a gun and outside of it which act in any way on a bullet have been worked out by some gun crank and it is my idea to explain them here.

Now, the ballistics of shooting may be divided into two parts, and these are (*a*) *internal ballistics,*

that is, the forces which act on the bullet inside of the gun when it is fired up to and including the instant the bullet has left the muzzle of the gun, and (*b*) *external ballistics,* that is, the forces which act on the bullet from the moment it has left the muzzle until it has struck the target, and all of which I shall try to explain in simple language so that you can understand it.

Internal Ballistics

The Explosion of the Primer.—The very first thing that takes place when the firing-pin strikes the cartridge is the explosion of the primer. If it is a good primer it will send a large flame into the charge of powder on top of it in less than a thousandth of a second. (See *A,* Fig. 38.)

What the Powder Does.—While the fulminate of the primer explodes, the powder on top of it does not, or at least it should not, explode, but instead it should only ***burn*** when the flash from the primer strikes it and further it should burn slowly and evenly, one grain lighting the next one to it until the charge is all consumed. The idea is shown at *B,* in Fig. 38.

Now, as every grain of powder burns it sets free a certain amount of gas and when nearly all

of the charge is burned the gas generated by it is under a very high pressure and it pushes on all sides of the cartridge with equal force, but since

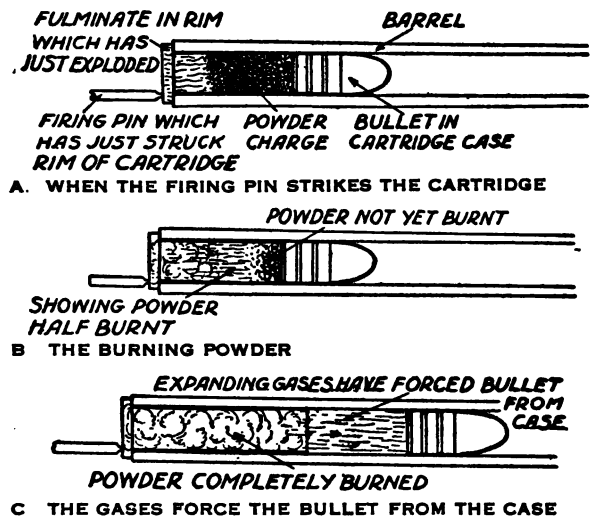


Fig. 38—The Explosion of a Cartridge.

it can't get out except at the open end it has got to start the bullet in order to do so.

As the charge of powder burns the pressure of the gas grows greater and ever greater until the *inertia* of the bullet—that is its dead weight—is overcome and it is forced to leave the shell as shown at *C*, in Fig. 38.

What Happens in the Barrel.—As the bullet is shot out of the cartridge by the expanding gases, it starts down the barrel of the rifle at a high speed, or *velocity* as it is called, and the rifling makes it spin as it goes. The diagram Fig. 39 shows how the bullet spins.

In order to overcome the inertia of a body a force must be applied to it for a length of time that

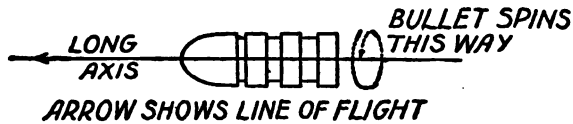


Fig. 39—The Bullet Spins on Its Long Axis.

is in proportion to the weight of the body; for this reason, as you will plainly see, *time* is an important *factor* in the moving force of powder and the *ballistic value* of a powder, which means the value of a powder to give a bullet of a given weight a certain energy and hence its velocity, depends on the *length of time* needed for its complete combustion.

In an absolutely perfect cartridge—though it is not possible to make one—the bullet would be given an evenly increased velocity by the pressure exerted on its flat end, or *base,* until it left the muzzle of the gun and the last grain of powder would be

changed into gas just as the bullet left the muzzle of the gun.

In this purely imaginary perfect cartridge every bit of the stored-up energy of the powder, or *potential energy* as it is called in physics, would be changed into energy of motion, or *kinetic energy,* and this would be imparted to the bullet.

Of course such complete change is not possible, for a large part of the stored-up, or potential energy is spent in heat and part of the energy of motion, or kinetic energy, is also converted into heat by the friction set up between the barrel of the rifle and the bullet.

If the Powder Explodes.—You have observed that there is a considerable difference in the action of powder when it burns and when it explodes. As I said before, a slow, even-burning powder produces much the best result, while with a powder that explodes, or *detonates* as it is called—which means that all of the stored-up gases in it are set free at once—its ballistic value is not only very much less, but it sets up a quick pressure in the gun that usually is dangerous.

When the powder detonates instead of liberating its gases by slowly burning, the cause of it may often be traced to the use of a small-grain powder in a gun of large bore. Under these untoward

conditions when the primer goes off the grains of powder nearest to it are lit and because of the high pressure of the gases set up by this too rapid ignition the grains nearest the bullet are forced up against the end of the latter and crushed.

When this takes place enough heat is developed to explode, or detonate, the forward grains with lightning-like rapidity; this in turn causes an excess of pressure at the bullet, which is often three times as great as that of a cartridge which explodes under normal conditions—that is, by the powder burning slowly—and as a result the barrel may be blown to pieces.

This is one of the reasons why cartridges should never be loaded by any one except an experienced loader. To prevent detonating, the powder should be left loose in the shell, so that there is an air space between the powder and the bullet.

The air space naturally lessens the pressure on the forward grains of powder and in this way the risk of detonating and the disastrous results that sometimes follow are reduced to a bare possibility.

With smokeless, or *nitro* powders as they are called, the accidents that have occurred from detonating are usually caused by the amateur shell loader getting dense powder and bulk-for-bulk powder confused and using the former where he

should have used the latter. To safeguard against all these things taking place, buy your ammunition ready-made and buy a make that is tried and true.

Fouling of the Barrel.—*Fouling* is another important branch of internal ballistics. The chief cause of fouling is the fact that all of the various substances of which powder is made do not burn up and form gases, but instead a part of them are reduced to a liquid or a solid state, and these are forced along toward the muzzle of the gun by the gases of the powder that is burned up.

The *lands,* as the sharp corners of the rifling are called, tend to hold these particles or deposits, with the result that the barrel begins to get crusted. Each time a shot is fired a little more of the deposit is formed and a little more fouling results, until finally the crust is so thick that the bullet in passing through the barrel gets scraped and this leaves small particles of lead behind.

The combined effect of the lead and fouling causes the barrel to rust, and many a fine gun has been spoiled in this way as well as making it bad to use, for fouling is very apt to lower the velocity of the bullet as well as to throw it out of its true path.

The Kick, Jump and Flip of a Gun.—Internal

ballistics also have to do with the *kick, jump* and *flip* of a gun.

The *kick,* or more properly the *recoil,* of a gun is its movement in the opposite direction to the way the bullet is going, that is, straight back against the shoulder, as shown in Fig. 40.

Now, when a cartridge is shot off if the resistance of the air to the bullet is equal in pressure to

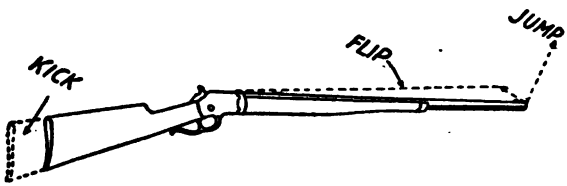


Fig. 40—The Kick, Jump and Flip of a Gun.

the weight of the gun then the bullet will not be shot out of the gun, but the gun will be shot back, or recoil from the bullet.

The resistance of the air depends on the speed of the bullet, and since the bullet is moving at a low velocity just after the cartridge explodes, and since the butt of the gun is resting against your shoulder, it is the bullet that leaves the gun and not the gun that leaves the bullet.

After the bullet has left the muzzle of the gun the gases rush out, but these are met and opposed

by the resistance of the air just as the bullet was before it, so that, though it may seem strange on first thought, the gun really acts as if the gases were rushing into the barrel instead. Hence the gun does not recoil, and the kick is not felt until after the bullet has left the muzzle.

Another and more simple reason why the bullet leaves the gun instead of the gun leaving the bullet, is that it takes a longer *time* to move the heavy gun from its position of rest than it takes to move the lighter bullet.

In auto-loading guns hardly any kick reaches the shoulder, for the energy of the recoil is made to do useful work in reloading the gun.

The *blast,* as the rush of the gases out of the barrel is commonly called, also has a direct effect on the velocity of the bullet. It has been shown by experiment that the instant after the bullet has left the barrel the blast increases its velocity in the neighborhood of 20 feet per second.

The *jump* of a rifle is often the cause of an otherwise good shot making a poor target. This results from the uneven expansion of the barrel due to the heat of the explosion and the quick passage of the bullet through the barrel.

Because of this jump rifles shooting black powder usually shoot a little *lower* than where they

are aimed and those shooting smokeless powder shoot a little *higher* than where they are aimed.

The *flip* of a rifle, also shown in Fig. 40, is due to the same cause as the jump—that is, uneven expansion of the barrel—and this tends to throw the bullet to the right or the left of the spot you have aimed at.

External Ballistics

The Part That Rifling Plays.—The instant the bullet strikes the air after leaving the muzzle of the gun certain other forces begin to act on it, and these make up what is known as the science of *external* ballistics.

First of all, the rifling of the gun, as I have pointed out before, makes the bullet spin on its long axis. If a long bullet—that is, a bullet whose length is greater than its diameter—was shot from a smooth-bore gun the air resistance would make it rotate, that is, turn over and over, on its short axis.

But when a bullet leaves a barrel that is rifled it spins on its long axis like a top, and this more than offsets any tendency it may have to spin round on its short axis, and the result is that it bores its way through the air in a much straighter line than is taken by an ordinary round bullet.

Long-range Bullets.—Just as a long bullet is better than a round one so certain kinds of long bullets are better than other long bullets.

The kind of bullets that give the best results for long-range shooting are those that are known under the name of *elongated cannelure,* or *grooved* bullets with sharp or flat heads. The purpose of the cannelures, or grooves, on a bullet is for *lubrication,* that is, the grooves are filled with grease.

You can increase the power of your rifle to a measurable extent by using a *flat-nosed,* hollow-pointed bullet and its use will also give a *flatter trajectory,* as you will soon see.

The Path of a Bullet.—*Air Resistance:* The *trajectory* of a bullet is the path it takes from the time it leaves the muzzle of the gun until it reaches the target. It is shown in Fig. 41. As the bullet leaves the muzzle of the gun and meets the head-on resistance of the air, of course the latter tends to retard or hold it back in its flight. The *amount* of air resistance depends on the *shape* of the bullet, its *cross-sectional area,* and on its *velocity;* the density of the air also has a retarding influence in a small measure on the flight of a bullet, that is it tends to hold it back.

The Force of Gravity.—But the chief factor in shaping the path of a bullet as well as retarding its

flight is that greatest of all forces—the *gravitation* of the earth; of course you know that the earth attracts all bodies upon or near its surface—whether it is the moon or a bullet—and this attrac-

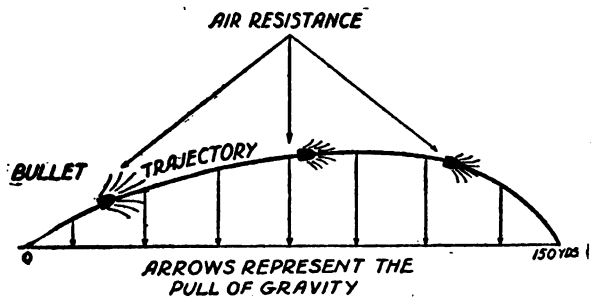


Fig. 41—The Path, or Trajectory, of a Bullet.

tion pulls the bullet as it flies along down to the earth.

The Speed of a Bullet.—From your school *physics* you have learned that a body will fall about 16 feet the first second, 48 feet the next second, and so on until it strikes the earth. But if you will throw a stone straight out and so give it *velocity*—that is, speed—it will fall at the same rate as if you dropped it, but its speed will make it travel farther before it strikes the ground.

Now, since a bullet follows the same laws of gravitation and velocity as any other body, it must

be clear that if it has a *low* velocity it will strike the earth a very short distance from where it left the muzzle of the barrel, but, on the other hand, if it has a *high* velocity a longer distance will be covered between its discharge from the barrel and its contact with the earth.

From this you will readily see that the velocity of a bullet has a great deal to do with its trajectory, or the path of its flight, as well as gravity and air resistance; in fact, the velocity of the bullet, the resistance of the air and the pull of gravity all de-

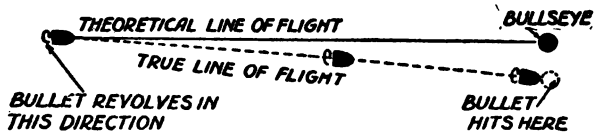


Fig. 42—The Drift of a Bullet.

termine the distance to which a bullet will go and the shape of its path.

The Flight of a Bullet.—The flight of a bullet can be beautifully shown by a stream of water thrown from the nozzle of a garden hose, where each particle of water is a freely moving body.

As you no doubt know, the flight of a bullet from a rifle is not in a straight line but in a long *parabola* just like a stream of water from a hose. The

bullet starts to drop the instant it leaves the muzzle, but in high-power rifles this drop is not noticeable up to about 100 yards and in some cases even more.

At distances greater than this *pointblank range,* as it is called, you have to raise, or elevate the muzzle of the gun and by so doing you make the bullet travel upward in a long curve for about two-thirds of its trajectory and then it falls sharply to the target.

Drift.—Besides the trajectory, or curved path, you have to allow for the *drift* of the bullet, and this is shown in the diagram Fig. 42. This drift of the bullet is caused by the rapid rotation that the rifling of the barrel gives it; in a rifle with a *right-hand twist* the bullet spins rapidly to the right and when shot over long ranges it moves to the right, and this is caused by the bullet rolling itself over in the air.

In some rifles there is a slight sidewise jump to the left, and the way to find the *total horizontal deviation* of the bullet without taking *windage* into consideration is to subtract the amount of the jump from the amount of the drift.

Windage.—Another thing that must be thought of in shooting over long ranges is *windage*—that is, the *deflection* of the bullet from its natural

course by the wind—but this will be described in the next chapter.

Penetration.—The last and final thing that happens in the flight of a bullet is its *penetration* of the target, that is, when it hits the mark you have shot at.

Both the .22-caliber long-rifle black and smokeless powder cartridges will penetrate five ⅞-inch

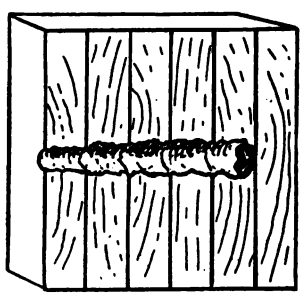


Fig. 43—The Penetration of a .22-Caliber Bullet (Through Five ⅞-Inch Boards).

pine boards at a pointblank range of 15 feet from the muzzle when the regulation 40-grain bullet is used. The penetration of a bullet at pointblank range in pine boards is shown in Fig. 43.

CHAPTER VIII

HOW TO BE A CRACK SHOT

OF course you have read the exploits of Cooper's *Leatherstocking* and his prowess with his rifle—or if you haven't you must surely do so, for he is a cracking hero and the tales are mighty good ones.

And because you are a fact and he was merely a fancy is no reason why you should not turn out to be as crack a shot as he, for you can have your pick of the family of .22-caliber rifles, and any one of them would throw his ancient gun in the shade.

The Shooting Outfit You Need.—To become a sharpshooter there are but four things you need that money can buy, and these are (1) a first-rate gun; (2) plenty of ammunition; (3) a *range* to shoot on, and (4) a *target* to shoot at.

The kind of a gun and the sort of ammunition you should buy have been described, and I am taking it for granted that you have already got these. As for the range your *environment,* and perhaps the *governor's* bank account, will determine in a

large measure whether it shall be in the house, in the backyard, at some shooting gallery, on the grounds of a private or a public gun club, in the Adirondacks or Rocky Mountains, or in far-off India or East Africa. About ranges and how targets are made and used and of their accessories more will be told in the next chapter.

The Boy Behind the Gun.—While all of the above equipment is needed to shoot with, whether

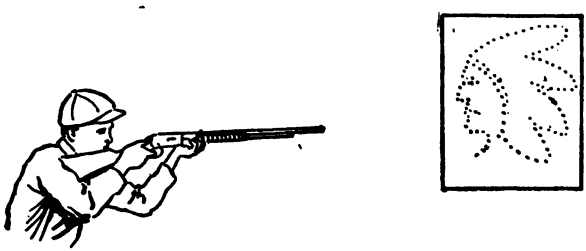


Fig. 44—The Boy Behind the Gun.

you are a beginner or an old-timer, there is (5) another element that goes with them to make a sharpshooter, and this is *the boy behind the gun.*

This *personal equation,* as it is called, and which means your mental and physical make-up, consists of just two things, and these are (*a*) a pair of quick, sharp eyes, and (*b*) the blood of a true sportsman coursing through your veins; and if you are gifted with these it doesn't matter one iota

whether you have freckles on your neck or anything else is the matter with you, you can become as good a shot as ever stood on a firing-line.

On Learning How to Shoot.—In learning to shoot it will make your first lessons easier if you can get some personal instruction, and this ought not to be very hard to do, for in nearly every family there is some one who knows the gun and how to use it.

But I am writing this book for the boy who has no one who can give him pointers on how to shoot right, and to learn to shoot the wrong way is worse than not learning at all. The following notes on correct shooting will put you on the right track.

How to Hold a Gun.—Just as there is a proper way to hold a pen when you write, or a telegraph key when you send a message, so too there is a certain way to hold a gun which sharpshooters have found to give the best results; and besides there are various positions they have learned to take that help the *score* along.

Standing Position.—One of the correct standing positions is shown at Fig. 45. To get this position stand sidewise with your feet about 10 or 12 inches apart and your left side toward the target.

Hold your rifle with the butt firmly against your

Fig. 45—Correct Standing Position.

right shoulder with your cheek pressed against the stock and your right arm resting against your body to steady the rifle. Don't strain the muscles of your body, but let them be free and natural, for if your body is not perfectly at ease even so small a thing as the beating of your heart may affect your aim.

Kneeling Position.—In Fig. 46 one of the proper kneeling positions is shown. Your right knee should point directly toward the bullseye and you should rest the elbow of your left arm over your left knee.

But when I say *elbow* I do not mean the point of it, which is sharp and wobbly, but the part of it just back of the point which is flat and steady. In this kneeling position your right arm is ***not*** rested against the body, but instead it is held along the side of the stock.

Prone Position.—The correct *prone* position—that is, lying flat on the stomach with the face downward—is shown in Fig. 47. When shooting in this position spread your legs wide apart with your toes out and heels in; then raise your body and rest both elbows on the ground so that you are in an easy position and raise your right shoulder a trifle.

Place the butt of the rifle against your right

Fig. 46—Correct Kneeling Position.

shoulder, with your cheek resting slightly against it and let the thumb of your right hand lie along the stock; and you are ready to blaze away.

Before you do any actual shooting, though, you should practice all of these positions until they

Fig. 47—Correct Prone Position.

come to you naturally, for correct position plays an important part in using a gun to the best advantage.

How to Aim a Rifle.—After having these preliminary details down fine you are ready to learn how to *aim* a rifle. Now, there are two different ways to do this and both of them are used by shooters at the present time.

The first way is to take a slow and painstaking aim at the target and without a thought or a care as to how long it takes to do it. This method is called *sight shooting,* and this is the way that is in general use today by most target-shooters, espe-

cially if the target is a fixed one. You should learn to shoot this way first.

The second method is called *snap-shooting,* and this is the quick, *spontaneous* way of pointing a gun at the target and pulling the trigger. This is the style that Buffalo Bill and other old-timers used in shooting glass balls or other flying objects. This style of shooting is coming into vogue again, and in due time you should practice it.

Sights and Sighting.—After you have taken the correct position—whichever one you want—look through the *sights* with your *right eye* and keep the left one closed.

If the sights are of the ordinary kind the *rear sight*—that is, the one on the end of the barrel nearest your eye—will be of the *crotch, leaf, bar* or *V-style* as it is variously called, and the *front sight,* which is fixed on the barrel close to the muzzle, will be of the *knife-edge* or *bead* type.

About Sights.—In both the leaf and bar sights you will see by looking at *A* and *B* in Fig. 48 that a V-shaped crotch is cut in the upper edge, and hence the many names this kind is called.

A knife-edge sight is one that has a more or less sharp edge set into the front end of the barrel, while a bead sight is made very much the same way but instead of a knife-edge it has a round end, or

bead as it is called, on it and these are shown at *C* and *D* in Fig. 48. Personally I like the bead sight the best.

With the ordinary crotch sights there is always a shimmer on the barrel and the receiver, caused

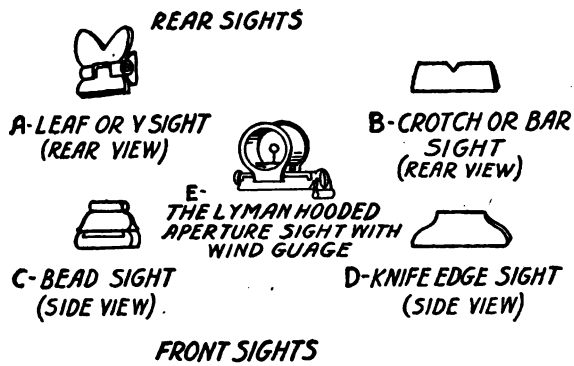


Fig. 48—Various Kinds of Sights.

by the reflection of the light on these parts, which is very hard on the eye, but rear sights are made by the Lyman Gun Corporation that are larger and have a bead in the middle of a ring, or hoop, as shown at *E* in Fig. 48; this does away with the shimmer of the light and besides it shows the whole of the object aimed at.

Sights are also made that have a *wind-gauge* adjustment and by means of which a shooter can

allow for windage as well as raise his sights for any range with precision.

About Sighting.—Now, if you will look through the rear sight and down the barrel to the front sight, and shift your gun a little up or down, left or right, until the bottom of the bead of the front sight just touches the bottom of the V of the rear sight, and at the same time get the top of the bead of the front sight exactly under the bottom of the bullseye, as shown at *A* and *B* in Fig. 48, you will have taken aim, and if at this instant you pull the trigger the bullet will hit the mark.

In aiming you must also be very careful that the barrel of your gun is perfectly straight, for if it is *canted* as it is called—that is, tilted to one side or the other—it will throw the line of sight out of true and this will make you miss your mark.

When to Pull the Trigger.—When you take aim the muzzle of your gun will probably waver a bit, but just as the rear sight, front sight and bullseye are all in a line you must pull the trigger back evenly and not with a quick jerk.

To pull the trigger with even pressure you must use the first joint of your *index*, or trigger finger, alone, and you should so train it that your hand does not involuntarily contract, that is, close up of its own accord. After some practice you will

be able to take aim with a fair degree of certainty and to make a pretty good target.

How to Practice Shooting.—When you start to practice make your target range about 25 feet, and as you become more proficient increase the distance until you can throw ten consecutive shots in a 1½-inch circle at a distance of 100 yards. You are then *some* shot.

The mistake that most beginners make is to increase the range too fast, and so I say unto you for your own benefit and behoof go slow and by going slowly you will go surely. When you can put ten shots one after the other through a postage stamp at 50 yards you won't need any one to tell you that you are really an expert shot.

The Art of Snap-shooting.—While snap-shooting will be very much harder than sight-shooting for you to get the knack of, still you will be well repaid for the time and trouble you take to practice it.

Snap-shooting is done like this: you don't aim your gun through the sights as you do in sight-shooting, but you take aim by *instinctive sighting*, that is, by bringing the gun to your shoulder, looking straight at the target or other object that you want to hit and pulling the trigger. In this way you get a bead on it *automatically*.

When beginning the practice of snap-shooting it is a good plan to set up a fixed target at about 25 feet and then raise and point your gun at it quickly, and as you do so keep *both* eyes open and focused *on* the target and *not* on the barrel of your gun.

After having practiced this exercise until you feel that you could hit the target it is time to use ammunition and, as the old saw goes, if at first you don't succeed try, try again until you do. As you grow more and more skillful you should increase your range until you are shooting 100 yards in this way. When you become an expert at snap-shooting and use a repeating gun you can pump 12 or 15 shots into an amazingly small target and with lightning-like rapidity.

The Science of Trap-shooting.—When you can make the kind of a target described above with your rifle you are in a fair way to become a good *trap-shooter* with a shotgun, that is, you will be able to break clay targets thrown from a *trap* with considerable confidence and every chance of success.

As a matter of fact, shooting either *clay balls* with a rifle or *clay pigeons* thrown into the air by a trap with a shotgun cannot be done nearly as well by the get ready, take aim and fire method as it can by the snap-shot method, though many trap-

shooters still use the sight aim, but they are back numbers in the shooting game. But more about clay targets and traps to throw them with anon.

Trajectory, Windage and Drift Again.—When shooting in closed ranges the trajectory and drift and the action of the wind on the bullet, described in the last chapter, need not be taken into consideration for the following reasons: (1) because the range is not long enough to produce a curved trajectory; (2) the drift in so short a distance is scarcely noticeable, and (3) there is little or no wind.

If you are shooting a .22-caliber rifle you need not bother overmuch about these things, for the range is too short; but for long-range shooting these three factors are very important and especially if you are shooting a large-caliber gun. The way to overcome these *deviations* of the bullet from a straight line is to use sights which are made so that you can allow for them.

About Gun Silencers.—With some beginners the noise of a gun seems to make them flinch, and if it should so happen that you are one of them try a Maxim *silencer*. This is a device that is fitted on the muzzle of the gun (see Appendix I for a complete description) that kills the noise of firing.

After using a gun for a while you will most

likely lose this tendency to flinch, and you can then take it off. Don't get discouraged if you flinch, for there are some shooters that never get over this habit, and yet they manage somehow to make good scores.

A Last Pointer.—As a last helpful hint on how to become a crack shot just remember these two things: First, every time you shoot if you do so with the avowed intention of improving your skill you are just that much nearer to making a target of success. Second, if you do not study out just why each shot that misses its mark does so and then try to correct it the next shot you make, all the shooting you may do won't improve your marksmanship, at least so that you can notice it. In other words, brains are a factor in hitting the bulls-eye of a target when shooting just as much as they are in the game of life.

And if you will do the things in this book the way I have told you to do them, and then practice for half an hour every day, it will not be very long until you will be able to hold your own against all comers, nearly.

Taking Care of Your Gun.—There is, come to think of it, another secret in being able to run up high scores, and that is a clean gun.

No matter how good a shot you are you can

never shoot straight if your gun-barrel is fouled, and a fellow who doesn't think enough of his gun to keep it clean will never have the pride necessary to make even a good shot.

Your Cleaning Outfit.—When you buy your gun get a *cleaning-rod* at the same time. This is made of either iron, brass, hickory or celluloid with a handle on one end and a slot in the other end to take a rag wiper. A rod costs from 10 to 50 cents according to the kind.

Canton flannel makes the best wipers. A bottle of *sperm oil* or sewing machine oil will do for lubricating the different parts of the action; a bottle of raw linseed oil for polishing the stock and hand guard, and some *cosmic oil,* or *cosmoline,* for cleaning the firing chamber and bore will make up the rest of your cleaning outfit.

To Clean Your Rifle.—To take down the gun, if it is a .22-caliber rifle, you need only to unscrew the large screw on the underside of the receiver, when the barrel can be easily taken from the receiver and stock and you can now get at the barrel from the breech end.

Cut a patch of flannel 1 inch square, slip it into the slot of the cleaning-rod, dip it into the *cosmic oil* and run it through the barrel from the *breech end.* When the wiper has come out of the muzzle

don't attempt to pull it back until you have removed the wiper. Never clean the barrel from the muzzle end, as you will almost be sure to spoil the rifling near the muzzle. Neither need you be afraid of using too many wipers, and *never use anything but cosmic oil,* or *cosmoline, for cleaning the firing chamber and bore.*

To clean the action take the screws out of the side of the receiver, when the lever, hammer and trigger can be removed. Wipe off all of the parts with a dry rag first and then with a rag with a few drops of either sperm or machine oil on it, but be careful not to get too much oil on them.

Rub the stock and hand guard with raw linseed oil and polish by rubbing them with your hand.

Corrosion by Smokeless Powder.—Should you use smokeless powder cartridges you should clean your gun as soon after firing as you can, for nitro powders leave a *residue* that has a tendency to eat into the barrel.

The following method is recommended by the War Department for the care of Springfield rifles, and it is just as good for your gun: Thread a bit of flannel into the slot of the cleaning-rod and soak it in a solution made by dissolving ¼ pound of *sal soda* in a pint of hot water and clean the bore thoroughly.

Dry the bore with dry bits of flannel and finally oil it with cosmic oil as described above. After it has stood 24 hours the bore should be cleaned again, as the gases from the powder are forced into the pores of the steel and unless it is cleaned the second time it is apt to rust.

Removal of Metallic Fouling.—How a gun is fouled and how particles of lead are scraped from the bullets on going through the barrel has been described in a chapter that has gone before.

The following solution for removing metallic fouling is also recommended by the War Department: Get ½ ounce of *ammonium persulphate;* 100 grains *ammonium carbonate,* 3 ounces of *28 per cent ammonia* and 2 ounces of water, which will make enough remover to clean ten rifles. When you buy these chemicals have the persulphate and carbonate powdered; then mix them together, add the ammonia and water, stir the solution well and let it stand for half an hour before using.

Push a cork into the breech end of the barrel, fill the bore with the solution and cork up the muzzle. Let the solution stay in the bore for a couple of hours, or until it has cut the metallic fouling, when it must be emptied and the bore cleaned out with dry flannel as before. You must be mighty careful to remove every particle of the solu-

tion from the bore, for it will rust it very quickly. The solution, which is rather costly, can be used several times.

When You are All Through.—Unless you are going to use your rifle right away put it in a *cover* or a *case,* the purpose of which is to keep the gun looking nice as well as to make it easy to carry. A cloth rifle cover can be bought for as little as 50 cents and on up to $2.50; it consists of two or more pockets into which you slip the stock and barrel of the gun, after having taken it down, and the cleaning implements. A rifle case made of leather will last much longer and will keep the gun in better condition than a cover; you can get one at any price you want to pay, from $5.00 to $10.00.

CHAPTER IX

ABOUT TARGET PRACTICE

THERE is a lot of fun in roving around, especially if you have a partner, and taking pot shots at any and every thing you see, but this is a sport that only a few fellows can indulge in.

If you live in the city the law won't let you shoot whenever and wherever you like, and if you live in the country this kind of promiscuous shooting is also very often tabooed.

The Shooting Gallery.—The only chance if you live in a community that is at all thickly settled is to shoot in a *range.* Nearly every city has one or more *shooting galleries,* as they are called, but to take an occasional three shots for a nickel won't help your marksmanship very much.

A better way is to make a deal with the owner of the gallery so that you can use your own rifle and ammunition and his range and targets, but even this is a poor makeshift and is never very satisfactory, and I would not advise this sort of an arrangement except as a last resort.

A Home Shooting Range.—The next best arrangement is a range in your own home, and if you can get a clear space 6 to 10 feet wide and 30 to 40 feet long you can easily make a range that will give you a good deal of pleasure and much needed practice.

I knew a boy in New York City who lived in a big apartment house and who had a long hall fitted up as a range. But I wouldn't recommend this plan to you or to any one else. However, there are plenty of basements and roofs, though, in every town and city that could be rigged up easily, safely and cheaply.

What is Needed for a Range.—The four main things that are needed in fixing up a shooting range are: (1) the *targets* to shoot at; (2) a good serviceable *backstop* to catch the bullets and hold them; (3) a protection for the side walls around the targets, and (4) some *mats* to kneel or lie on when you are shooting from a kneeling or prone position.

And right here I want to say that the targets must be well lighted, and for this reason you should fix up your range where there is plenty of daylight if possible, for lamplight, whether it is the dizzy light of a candle or the brilliant beam of the incandescent *Mazda,* is hard on the eyes; and it is better not to shoot at all than to strain your eyes.

Where artificial lights must be used then the lamps should be arranged back of reflectors that are fixed about 4 feet in front of and just above the target so that the direct light will shine on it and not in your eyes.

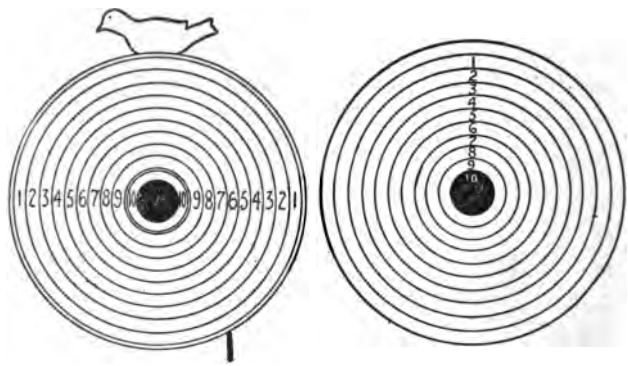


Fig. 49—Two Kinds of Fixed Targets.

The Kinds of Targets to Use.—There are several kinds of targets, and these come under two general heads, which are (1) *fixed targets* and (2) *moving targets.* Whichever kind you use you can buy them cheaper than you can make them.

There are two kinds of fixed targets in general use, and these are (*a*) flat, *disks of iron* and (*b*) those made of *paper.* A plain, round iron target

for .22-caliber cartridges can be bought for about $2.50, and a larger one having a 12-inch disk with a bell back of the bullseye and a bird on top of it as shown at *A* in Fig. 49, can be had for $4.00.

When you fail to make a bullseye the bullet makes a black mark on the target and these marks can be painted out with some white paint. The advantage of an iron target is that it can be used over and over and the only trouble with it is that a bullet sometimes glances off.

Paper targets are the best kind for you to use, for they are both safe and cheap. You can buy them in sizes made for ranges of various lengths from 25 yards up to 200 yards. The right kind of a target is made of heavy glazed paper, and for a 25-yard range the official size is 5 inches in diameter with a ½-inch bullseye; for 50 yards it has a diameter of 10 inches and a bullseye of 2 inches, and for 100 yards it has a diameter of 20 inches and a bullseye of 4 inches. One of these targets is shown at *B* in Fig. 49.

The targets are to be glued or tacked on to a *bullet catcher* and this can be done with Le Page's, or any other good glue, or by means of *thumb tacks.*

How to Make a Bullet Catcher.—Robert Houdin, the famous French conjurer of half a

century ago, amused and mystified his audiences by catching bullets shot at him in his teeth, but the bullet catcher I shall tell you about is merely a device to prevent the bullets from glancing, or *ricocheting* as it is called, from a hard *backstop* and perhaps injuring the shooter or damaging the furniture or both.

It is also a good scheme to use a bullet catcher, for in these days of wartime prices it may be worth your while if you and your friends do considerable shooting to save the spent lead and sell it to a junkman some day, for the price of a few dozen boxes of cartridges. And if you have a very saving streak in you, about which I have "me doots," then save the empty cases, for copper is worth even more than lead.

To make a bullet catcher build a box of ⅞-inch pine boards 10 inches wide, 11 inches high and 14 inches long. The box and the two pieces which form the front of it are shown in Fig. 50. It should be put together with screws and ***not nailed,*** as nails soon work loose from the constant hammering of the bullets.

After you have the box made and before you screw on the front pieces of wood line the back of the box with a ⅜-inch thick piece of sheet iron and the top, bottom and sides of the box can be

lined with thinner sheet iron. A hole is bored in the upper part of the back board to hang it up by, and it is then ready to have the targets tacked on to it. A bullet catcher of this size will hold two 5-inch targets, so that you and your pal can try out your skill at shooting at one and the same time.

The next thing on the list is to get a piece of sheet iron ⅛ inch thick, 3 feet wide and 4 feet

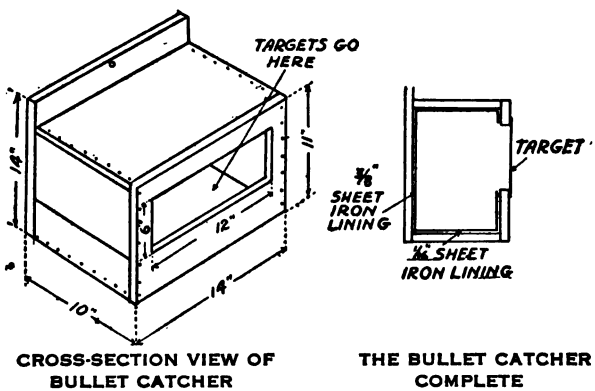


Fig. 50—A Bullet Catcher.

long for a backstop, and this should be nailed up to the wall so that you don't have to take it down each time you shoot. Of course if this cannot be done it is possible to take it down and put it up every time you practice, but it is bothersome to do it and I don't like bother when I'm out for sport.

The bullet catcher is, naturally, hung in the middle of the backstop.

When you shoot from a standing position the backstop, bullet catcher and target are nailed up so that the latter are about even with your eyes. When shooting from a kneeling position the same rule applies and when shooting from the prone position the target should be about 18 inches from the floor.

The main thing in lighting up targets by lamps of some kind is to throw a good light on them. If your house is wired and your range is in it or just outside of it and you know how to do electric wiring [1] it will not be very hard for you to rig up some lights; gas lighting is harder and more expensive to install than electric lights, while oil lamps are easier and cheaper.

Another easy way and a pretty good one is to get a couple of *acetylene* lamps such as are made for campers and set them up on each side of the target so that both of them will throw their light directly on it. Lamps of this kind can be bought for about $1.00 apiece.

An old camp blanket will pass for a mat for kneeling and prone shooting, or what is "just as

[1] Directions for electric-wiring will be found in ***The Book of Electricity*** by the present author.

good," as a parrot would say, is a mat made by sewing two or three pieces of carpet, that are laid one on top of the other, together. Better mats can be bought and it must not be forgotten that when shooting from these positions, to be comfortable promotes accuracy.

How to Make a Swinging Target.—With very little ingenuity you can make a swinging target that will give you a chance to practice not only sight-shooting but snap-shooting as well on a slow or a fast moving object, that is, if your range is out-of-doors and it is amply protected with a backstop.

To make a swinging target saw out a board of 1-inch thick stuff, 12 inches square, and fasten a paper target to it with thumb tacks. Now hang the board from a convenient nail in front of the backstop so that it can swing freely by means of a piece of string, or what is better, by a strip of wood 1 inch thick and of whatever length you want it, and hinge the top of it to a support like the pendulum of a clock. It goes without saying that if you want a quick-swinging target the pendulum must be short and for a slow-swinging target the pendulum must be long.

The Right Kind of a Range.—Wherever you live, whether it is in the city or the country, you

are not likely to have any trouble in finding the right kind of a site for a range.

To build and conduct a range on as large a scale as the one I shall tell you about here will cost something both for materials and for putting it up unless you and your friends get busy and do the work yourselves.

Now the question with most boys is how to get the necessary *wherewithal* and to do this you ought to, by rights, start a *rifle club,* as this will make things easier from the point of finances and far pleasanter from the point of sociability, all of which you will find out about in the next chapter.

You can start with one range of 25 yards, but your site should be wide enough to have three separate ranges of 25, 50 and 100 yards, the firing-line being the same for each range.

With a real range of this kind instead of simply using a backstop of sheet iron, a big backstop called a *butt,* as shown in Fig. 51, is the proper thing to take care of beginners who shoot wide of the mark and others whose bullets occasionally go wild. A butt can be made of 1-inch thick lumber and the front and back are each 12 feet high and 15 feet long, as shown in Fig. 51.

These are set up and held apart by cleats on the top and sides, and the whole frame is then

placed in position and fixed there by a pair of braces nailed to the back. The space between the board is filled with gravel or crushed stone and the front should be covered with sheet iron.

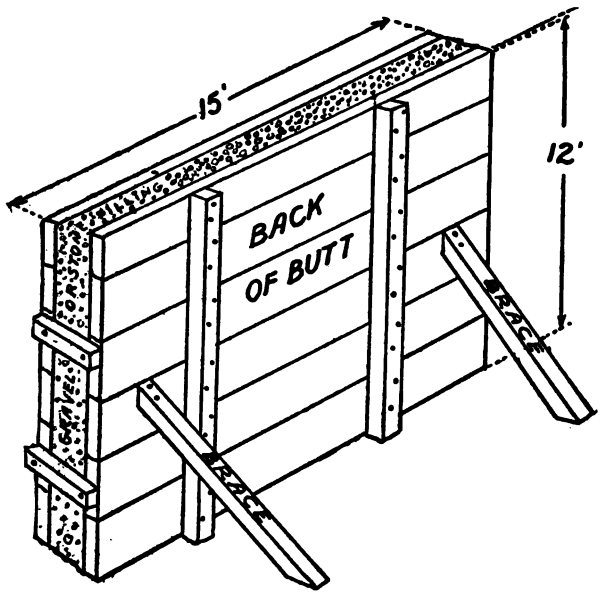


Fig. 51—Butt for a 25- and 50-yard Rifle Range.

A butt for a 100-yard range should be 15 feet high and 20 feet long, and it won't take very much figuring to find out that you will need quite a lot of lumber for it.

Four bullet catchers should be hung at equally spaced distances across the front of the butt; the next thing to do is to make a couple of frames 6 inches wide, inside measurement, and 15 feet long of pine strips; the latter should be about ½ inch

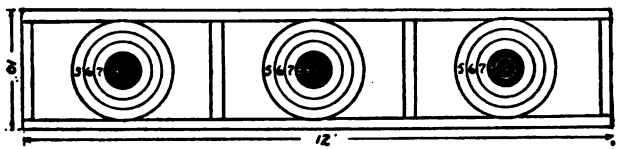


Fig. 52—A Target Frame.

thick and 3 inches wide, as shown in Fig. 52. The targets are thumb-tacked to the strips and the frame can then be suspended in the middle of the butt, so that each target is directly over the opening of a bullet catcher.

When the scores have been run up the frames with the targets on them can be easily carried from the butts to the firing point for the shooters to see what they have done.

A small *telescope* set on a tripod like those used for supporting cameras is almost a necessity for a range like this so that the *hits* can be located without running 50 or 100 yards every time a shot is taken.

To make a range a howling success the firing-

line ought to be sheltered, for then no matter what the weather conditions are the shooters can have a warm place for target practice.

Rifle Practice with Trap-thrown Balls.—A much cheaper way to practice rifle shooting as far as its first cost is concerned and to my way of thinking

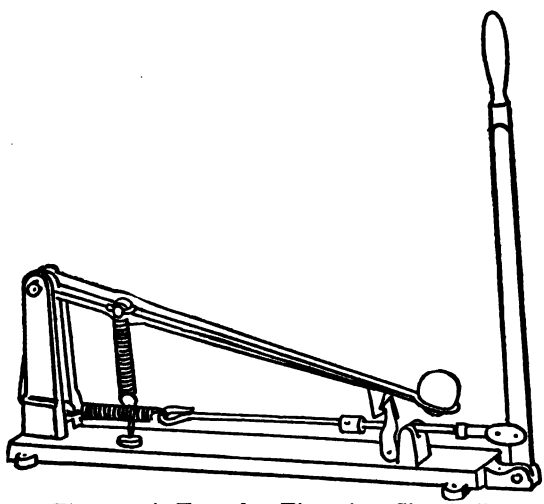


Fig. 53—A Trap for Throwing Clay Balls.

one that is far more exciting is to shoot at balls which are thrown into the air from a *trap* like the one shown in Fig. 53.

This trap is made by the Chamberlain Cartridge and Target Company and costs $3.50, and as far

as I know it is the only rifle ball trap on the market. It is worked by two powerful springs (see Fig. 53), and it throws a 1⅝-inch solid ball, or a 2⅛-inch hollow ball into the air a distance of from 40 to 60 yards at a height of from 10 to 12 feet at 10 yards from the trap, which is the distance and elevation prescribed by the standard trap-shooting rules. These balls are made of a composition of clay and pitch.

It is better for a beginner to practice shooting at the hollow balls just because they are larger and these come packed 500 in a barrel and they cost $4.00 per barrel. Later on the solid balls can be used, and these cost $9.75 per barrel of 1,500. When you can break 10 solid balls out of 10 shots with a .22-caliber rifle you are ready to get in with the regular fellows and shoot clay pigeons with a shotgun.

Trap-shooting with a Shotgun.—Now that I have told you about targets that are fixed, swinging and in free flight for rifle shooting, I want you to know about trap-shooting with a shotgun.

To begin with, trap-shooting is the only kind of target practice with a shotgun that is worth while and it is the finest sport in the world. To do trap-shooting you ought to have a space about 70 by 70 yards; of course you can do a little trap-shoot-

ing in a smaller space, but to get the most pleasure out of the sport you should have a fairly good-sized field, and it follows that the larger the field the more powerful traps you can use and the more costly they are to buy and to install.

But you can get a lot of fun and practice out of the cheapest and smallest hand trap. The cheapest one is made by the Chamberlain Company; it is

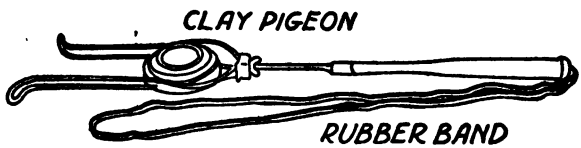


Fig. 54—A Simple Hand Trap.

called the *Ping-pong* and costs only $1.50. The simplest ones are made by the Marlin Company, and these are sold under the names of *muzzle-loader* and *breech-loader*.

The latter kind is shown in Fig. 54, and the target, which in this case is a *clay pigeon*—that is, a flat disk made of clay and pitch about ¾ inch thick and 3 inches in diameter—is dropped into the trap at the breech. You can throw targets with it to a distance of 20 or 80 yards and at a rate of 15 or more a minute.

Another thing about this trap that is good, is that it has a shoulder strap made of rubber, and

this allows you to throw your targets with your right hand while you hold your gun with your left hand, and the instant you throw the target you can let the trap go and it will not fall to the ground. The muzzle-loader is just a plain trap and costs $2.25, while the breech-loader costs $3.50.

The Du Pont Company makes a hand trap (see Fig. 55) that works like a gun in that you hold it

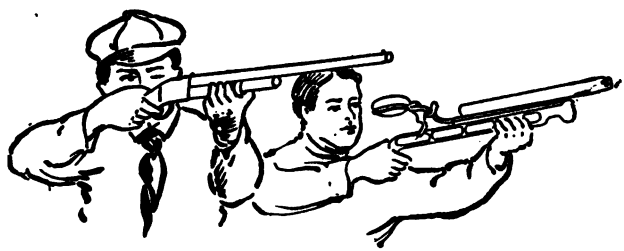


Fig. 55—A Du Pont Hand Trap that Works Like a Gun.

in your hands and pull a trigger like a gun, when a *clay pigeon* wings its way through the air, and as far as shooting is concerned a clay bird is just like a quail, or pheasant, or a duck, but as far as eating goes, why, I'd rather have crow, please.

With these little hand traps you can practice at your own time and place. It's truly great sport, so get in on it as soon as you can.

Regulation traps that are intended to be set in a pit 16 yards from the firing point, and which are

built to throw a clay pigeon not less than 45 yards nor more than 55 yards and to a height of between 6 and 12 feet at a point 10 yards from the trap, can be bought for as little as $4.50, while one of the same type that will throw the target with

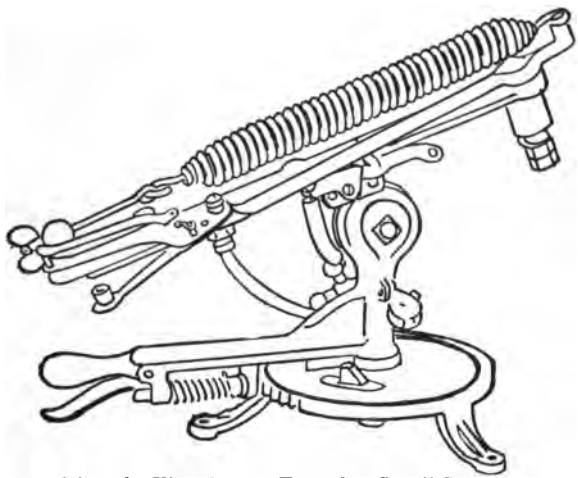


Fig. 56—The *Expert* Trap for Small Ranges.

a quick change of angles can be had for $6.50. These are the *Extension* and the *Expert* traps made by the Leggett Company. A good trap for a small club is shown in Fig. 56.

A really good trap should throw the target at an angle unknown to the shooter to within 45 degrees of each side of a straight line drawn

through No. 3 firing point, as shown at *A* in Fig. 57. Where double targets are thrown by a trap they should be thrown at an angle within 60 degrees of the straight line drawn through No. 3 firing point and the trap, as shown at *B* in Fig. 57.

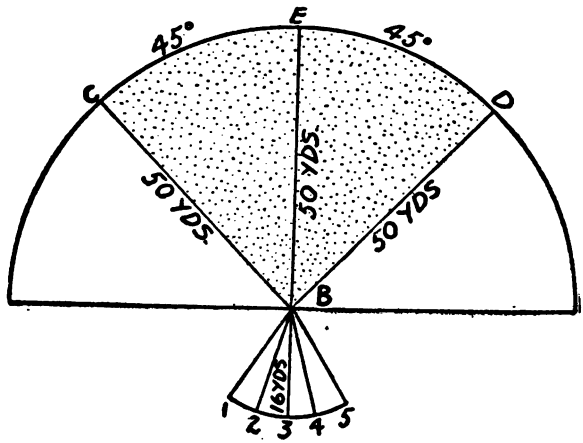


Fig. 57, A—A Single Target Field Layout.

The shaded parts of the diagrams *A* and *B* show the angles and distances of the various traps. The firing points 1, 2, 3, 4 and 5 should be separated from each other by from 3 to 5 yards; that is, they should be 3 yards apart when the firing points are 16 yards from the trap and 5 yards when 23 yards from the trap.

Unless you have started a club it is not at all necessary to have a trap which will throw two targets at the same time, or *doubles* as they are called, but if you start a club—well, then things are different and you can get whatever you want.

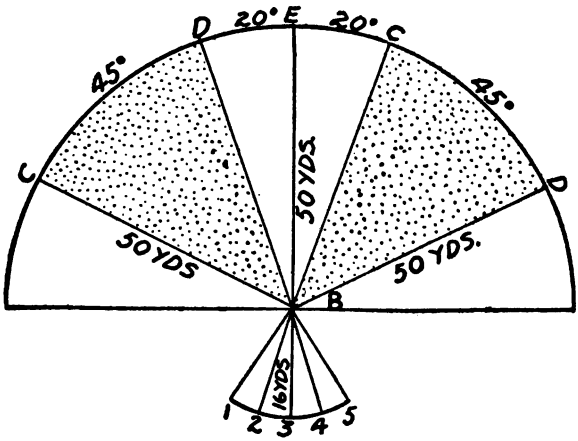


Fig. 57, B—A Double Target Field Layout.

The Sub-target Machine Gun.—In recent years, but especially during the past year, there has been a great deal of interest shown in teaching schoolboys how to shoot. To make this possible the rifle and machine shown in Fig. 58 and which together are called a *sub-target rifle* has been largely used, at least in New York City.

The sub-target rifle does not shoot a bullet, hence there is no noise, but both the gun and the target are worked by electricity, so that when you aim the gun at a little paper target and pull the trigger a pointer instantly punches a small hole in the sub-target and in this way the exact spot is shown where the bullet, had one been used, would have struck the real target which you aimed at.

More than this, every movement of the rifle while you are aiming it is traced on the target, and any fault which would affect the flight of a bullet, had the rifle been loaded with one, can be seen and the defect of your aim and pull-off can then be corrected.

Any rifle can be fitted to the sub-target machine from a .22-caliber to a U. S. Springfield, and it will operate just the same. The weight of the rifle is held entirely by the shooter, whether standing, kneeling or lying down. The whole thing is at once easy, natural and simple to use and it's mighty interesting too.

The sub-target machine rifle can be carried out in any schoolroom or other place where a space 20 feet wide and 35 feet long can be had. It is largely used in the Public Schools of New York City at the present time, having been installed by the Public Schools Athletic League.

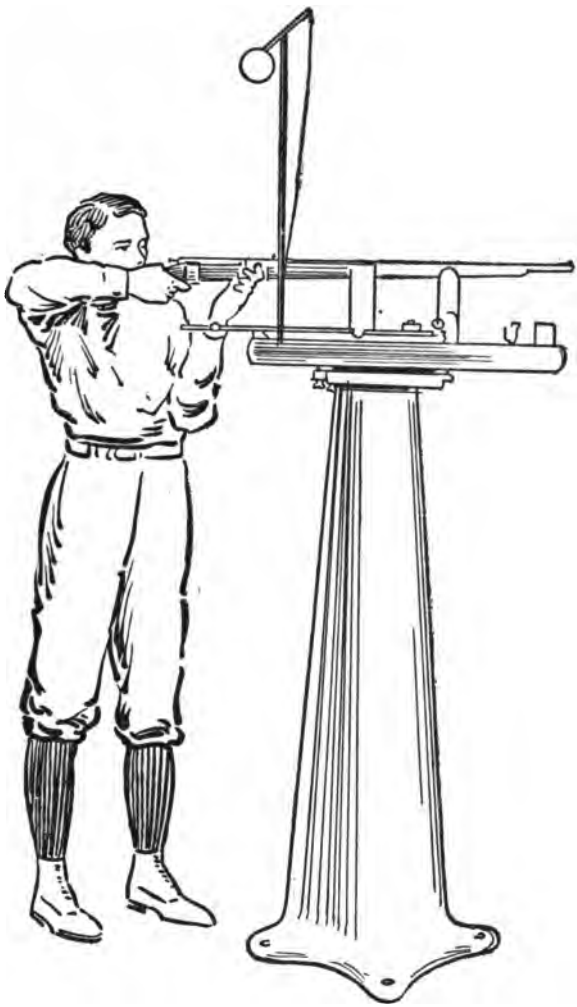


Fig. 58—A Sub-Target Machine Gun.

Rifle Practice in the Armories.—Schoolboys who belong to the above League and who have shown themselves to be good shots with the sub-target rifle are allowed to practice real rifle shooting at the ranges of the various armories throughout the city, and it is my best wish that this fine work and spirit of good will toward the boys, in and out of school, will be extended to all the other cities in the United States.

CHAPTER X

HOW TO START A SHOOTING CLUB

AS you have gathered from the last chapter, to get the most practice and the best sport out of rifle shooting you need a rather elaborate outfit.

This in the very nature of things costs money and more than the average boy can usually afford to spend. But don't let a little thing like this discourage you, for there are probably a hundred boys in every town of 10,000 inhabitants who would gladly join you in starting and keeping up a shooting club, and what's more there are many men who will freely contribute whether you let them join or not.

In the Very Beginning.—The real trouble is to find out who these boys and men are. As good a way as any is to tell your friends that you intend to start a rifle club and get as many fellows to come in with you as you can, and together you can name a place and fix a date for a *powwow* to be held and set it a couple of weeks ahead.

It is easy enough to get a place, and while you

can hold it at your own home, or the home of a friend, you can nearly always get the use of a room at a school, or at the Y. M. C. A., or at a church.

Now for Some Publicity.—Your next move is to go to the editors of your town papers and ask them to give you a write-up in their next issue. While the main purpose of this bit of publicity is to let the boys know that you are going to start a rifle club, it lets their folks know at the same time that your club will keep the boys off the street, give them a chance to improve their spare moments and at the same time to indulge in a manly sport.

The editors will gladly run in reading notices, as it is their business to publish items of general interest, for of such are their papers made. Now, instead of merely asking them to write it up and so get only a paragraph or two the better way is to write the notices yourself and hand in something like this:

BOYS TO HAVE THEIR OWN RIFLE CLUB

Why Not Join and Learn to Be a Crack Shot?

Other towns have their boys' rifle clubs, but up to the present time *Sportstown* has

been a back number in this clean and healthy sport.

Better to be late than never, and our town will now have ranges where you can practice all the year around, and not only this but matches will be held and prizes given.

The first meeting to start the *Sportstown Boys' Rifle Club* will be held at the home of Mr. William Stock on May 22 at 8 o'clock. Everybody is invited, grown-ups as well as boys, and be sure to go and have your say whether you are interested in shooting or not.

As soon as the club is organized beginners will be taught to shoot by the best shots in *Sportstown* in a safe and sane way. Another purpose of the club is to promote social life among the boys.

The club will be conducted upon the small profits made from the sale of ammunition to its members. .22-caliber rifles will be furnished by the club to its members free and the ammunition will be sold to the members for 25 cents per box of 50 cartridges.

Two or three other write-ups of the same kind will help the good work along. These articles which you send in to the editors should be type-

written on 8 x 10½ paper and on one side only, and it is better to write each one up a little differently if you can.

Another good scheme is to print some notices on 8 x 10 cards announcing the time and the place the meeting is to be held and post these up in the windows of the hardware stores and gunsmith shops—with the permission of the owners, of course. They will be more than willing to help you, for it means money in their cash registers eventually.

Starting Your Club.—After taking these first steps have three or four of your good friends with you on the evening of the meeting and as the promoter and organizer of the club you should be the speaker, and you must be prepared to answer all kinds of questions, wise and otherwise.

When your audience is comfortably seated you can open your little speech by stating the aims and purposes of the rifle club. You should have in mind two or three places that could be used for a club, what a dozen rifles would cost, and about other things having to do with the club. Explain too that in order to start the club and to keep it going until it is self-supporting a small initiation fee will have to be charged.

At this point it is well to have one of your boon

companions suggest that every one present, men, women and boys—the girls don't count—pledge him- or herself to give $2.50, which represents a year's dues, for some boy and that each member pledge himself to get one other member.

After the names of the contributors and members have been taken you can announce that a further meeting will be held, naming the time and place, when the club will be organized, officers will be elected and a range picked out. You can then adjourn.

If it is hard for you to give a short offhand talk write out exactly what you want to say and read it, which will do just as well. Another thing, be sure that a reporter from each one of the papers is present, and always send the editors notice of each meeting to be held, with a request that a reporter be sent around.

This will greatly help the popularity of your club along, and when it comes to your shooting contests he will give ample space to them. This kind of publicity will make the club a matter of public interest and town pride, especially if you have some really crack shots in it.

Rules for Organizing the Club.—At your next meeting you can go ahead and organize the Club according to the following rules:

1. The Club shall be called the Sportstown Rifle Club.

2. The Club shall be managed by a President, Vice-Presidents and a Committee of eleven (five to form a quorum) elected by ballot at the Annual General Meeting each year.

3. The Officers shall consist of President, Treasurer, Secretary and Auditors, who shall be *ex-officio* members of the Committee and shall be elected annually at the Annual General Meeting each year.

4. Vacancies in the Committee, or Officers, occurring during the year may be filled by the Committee.

5. The property of the Club shall be vested in the Committee for the time being.

6. Application for membership shall be made in writing to the Secretary, Officers or Members of the Committee, stating the candidate's name and address and expressing his willingness to abide by the rules, and shall be accompanied by the first subscription. The candidate shall thereupon be enrolled a member.

7. Any member 14 days in arrears with his dues may be debarred from the privileges of Membership and after notice sent by post to his address his

name may be removed from the Roll of Members by the Committee.

8. The Committee may remove from the Roll of Members any member whose conduct on the range or upon any premises occupied by the Club, or elsewhere, is unseemly, objectionable or calculated to bring the Club into disrepute.

9. The Secretary or any Officer or member receiving any money on behalf of the Club shall forthwith hand the same to the Treasurer.

10. The Secretary shall have charge of all books, papers, accounts and documents of the Club. He shall duly record the proceedings of the Committee and at the General Meetings in the Minute Book; and he shall also conduct the correspondence and prepare the statement of accounts.

11. The Annual General Meeting shall be held as soon after the close of the financial year as possible at which time the following business shall be transacted: Election of President, Vice-President, Officers and Committee, receiving the Balance Sheet and Report of the Committee, revise and amend the Rules and By-laws. Not less than seven days' notice shall be given to convene a meeting.

12. Upon a requisition in writing duly setting out the purposes, signed by twenty members and delivered by post to the Secretary, the Committee

shall, within 21 days, convene a meeting of the Club.

13. Upon such requisition being duly served and not complied with within six weeks, the requisitioners may themselves convene a meeting by giving seven days' notice in writing to the members, duly setting out the purposes for which such meeting is called and any resolutions passed at such meeting duly convened shall have the same force and effect as if they were passed at a meeting convened by the Committee.

14. Any officer or member of the Committee may be removed by a majority of two-thirds of the members present at any General Meeting duly convened under Rules 11, 12 and 13, and such vote may be taken by ballot.

15. The Committee may:

(*a*) Make or alter if necessary by-laws and regulations in regard to the use of the range, shooting, handicapping, matches, rifles and ammunition.

(*b*) Sell or otherwise dispose of the property of the Club.

(*c*) May pay accounts and incur liabilities on behalf of the Club.

(*d*) May institute and defend legal proceedings on behalf of the Club,

(*e*) and may add to its numbers by co-option to the number of not more than three.

16. Any by-laws and regulations made by the Committee under Rule 15 shall be published by being exhibited on the Notice Board of the Club, and shall thereafter have all the force and effect of these rules, but shall be submitted for confirmation at the next Annual General Meeting.

17. The Auditors shall examine the accounts at least once annually with the invoices and vouchers, prior to the Annual General Meeting, and shall append thereto a certificate to the effect that the same are correct and fairly represent the expenditures and receipts of the Club and its assets and liabilities, and they may at any time inspect any book, document, or property of the Club in the possession of any officer or member, and they shall make a report thereon in writing to the Committee.

18. The Committee and officers are hereby indemnified by the Club against any claim or demand in respect of any liability properly and bona fide incurred on behalf of the Club.

19. The Vice-Presidents and Auditors may, if they think proper, attend Committee meetings but may not vote.

20. The financial year of the Club shall terminate on December 31st of each year.

Some Ways to Raise Money.—In every town there are fine, public-spirited moneyed men, and when you have your club organized you need not hesitate to go to them, explain what you have done and all about your club and ask them for contributions and any man if he has a drop of shooting blood in his arteries will gladly *chip in* and help the good work along.

Another and perhaps a higher-toned way to raise money is to do like the men's shooting clubs do, and that is to sell *bonds*. As a boy this may seem a little over your head, but if you want to finance your club in this way any business man or any lawyer—the former always preferred—will see you through it to the end that everything is done in a strictly businesslike manner.

The bonds should have a value of $5.00 each and carry interest at 5 per cent and as this gives you something to sell instead of asking for something for nothing, you ought to have no trouble in raising money on them. After the club is going strong it can buy back the bonds and pay the interest on them. These bonds should read after this fashion:

Five Dollars **Number 58**

BOND OF
THE SPORTSTOWN RIFLE CLUB

For value received the *Sportstown Rifle Club* promises to pay to the holder of this bond the sum of Five Dollars at the expiration of three years or before if it deems advisable and to pay 5% interest thereon annually on the first of January until the bond is redeemed.

William Stock,
President
Henry Bullet,
Secretary

January 5, 1917

Of course these bonds must not be issued until the officers of the club are elected and it is fully organized. The bonds look more businesslike if they are printed, but they will be just as good from an investment point of view if they are typewritten.

Getting the Club's Equipment.—By the time you have organized your club and sold its bonds there will be money a-plenty in the treasury to do things with. The first thing to do is to rent or otherwise get a suitable range and to buy a dozen or more .22-caliber single-shot rifles of some good standard

make; also get a dozen small telescopes of the single-draw kind for shooters to spot their hits with, and these should be supported on camera tripods or other stands. The guns are loaned to members who haven't their own but the telescopes are let out at 5 cents a day each just to help along the income of the club.

The butts should be built as described in the last chapter, though if there are no houses or roads near by they can be made much cheaper. The firing-line is then marked off and the club is ready for business. In summer a shelter is not needed, but by all means have the firing-line closed in and heated for the winter months, or I fear me your club will go up the flue.

When buying cartridges for the club buy them in large enough quantities so that you can get them as cheaply as possible and any of the big firms that make cartridges will quote you a very low price if you will tell them that they are for your club.

To help keep track of the cartridges as well as for the convenience they afford to members at the firing-line get twelve blocks of wood 1 inch thick, 3 inches wide and 5 inches long, bore 10 holes in each block and have each hole just large enough so that a .22-caliber cartridge will fit into it as shown in Fig. 59.

Elbow mats and mats for firing from the kneeling and prone position should also be provided if the club's funds will permit.

A general utility boy to take care of the ammunition, change the targets and do the hundred and one other little things that need doing around a range can be hired, but if money is an object let

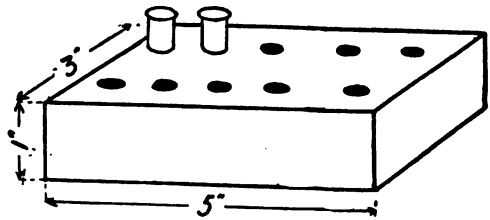


Fig. 59—Automatic Cartridge Counter.

each member take his turn and then you will be sure of getting good service.

How to Encourage New Members.—Crack shots don't need encouragement, but many beginners do. You should, as an officer of the club, see to it that they are treated right by the fellows who know how to shoot and a little supervision will make both of them enjoy the work.

As you will remember, targets are numbered from 1 to 10 including the bullseye. In ten shots the highest possible score would be ten shots placed in the bullseye, or a score of 100. Now, since

all the club's members cannot by any chance have the same degree of skill no matter how much they practice you must see to it that when they compete with each other something like an equal footing prevails or else the interest will peter out.

The System of Handicapping.—The best way to keep up the interest is by what is called *handicapping* and which works out like this: Suppose that Harry Hammer can only score 80 at his best, while Charlie Trigger usually scores 97 or thereabouts.

Now, in order to fix up matters so that they can shoot as though they were equally matched you must give Hammer a handicap. As he only scores 80 out of a 100 it must be clear that 20 per cent of his shooting is bad and for this reason he is given 20 points in a ten-shot competition while Trigger, who is only 3 per cent off, is given a 3-point handicap.

The handicaps of all the members should be posted on the bulletin board of the club and as fast as each member improves he should be advanced and allowed to shoot with shooters having a less handicap. In this way all of the shooters are evenly matched, theoretically, and the poor shot will have no cause to get sour and so lose interest. Also a record should be kept of each member's

scores, in order that his handicap can be properly fixed.

Prize Shooting Contests.—To further excite the interest of the members weekly contests should be held when small prizes are given to the winners. Contests are worked along this line: Four prizes, say, are given and the entrance fee, which is 10 cents per competition, covers the cost of them. Thus if there are twenty entries the first prize will be of the value of $1.00, the second 50 cents, the third 30 cents and the fourth 20 cents.

Each winner may either receive a small memento for the prize he won or he may take a *voucher* and when he presents a number of them at the end of the year he can get a larger and a more worth while prize, or, finally, he may take it out in ammunition.

Championship Contests.—Once a year your club should hold a championship contest in which the twelve highest winners of the weekly handicaps compete and the public should be invited to attend these meets.

There are two ways to provide for the medals, watch-fobs, stick-pins or whatever the prizes are to be. The first is to make the members pay an entrance fee of $1.50 to cover the cost of one gold, one silver, and two or three bronze trophies. The second way is to have the merchants of your town

donate the prizes, but never ask for donations of any kind unless the funds of the treasury are very low. For *Shooting Rules and Regulations* see Chapter XII.

How to Start a Trap-Shooting Club.—To start a trap-shooting club is less trouble than to organize a rifle club, although its membership is bound to be less.

The club should be organized along the same lines as a rifle club, but instead of $5.00 bonds you may have $2.50, as these are easier to sell, and the annual dues need be only $1.00.

A trap-shooting club is not expected to furnish guns to its members, expensive butts are not required, and a covered firing point is out of the question. For these reasons the dues are very small.

On the other hand, shotguns cost more than rifles, and the ammunition is more expensive, but the latter is supplied to the trap-shooting club members just as it is to the members of a rifle club, for on this the club makes its running expenses.

A good scheme, though, is to build some kind of a shelter where the shooters can come in in cold weather and warm themselves and get a bite to eat and some hot coffee to drink, for shooting in the open makes a fellow hungry and eating makes him

thirsty, and both of these habits when satisfied make him want to go out and shoot again.

The first money taken in from dues and the sale of bonds furnishes the funds for buying traps, targets and ammunition and the lunch counter if you have one, and each member pays for his ammunition, targets and *eats* at a slightly higher rate than the club pays for them.

The business of the club and handicap matches are conducted along the same general lines as that of a rifle club. About the only thing that is different is the shooting rules, and a word about these will be found in Chapter XII. These rules will also give you a pretty good idea of laying out the grounds.

CHAPTER XI

WHY EVERY BOY SHOULD SHOOT

AS a boy among boys you very likely know that many parents most strenuously object to a fellow learning to shoot.

If you take as naturally to shooting as a duck takes to water, or if you have watched other boys hit the bullseye, or a clay bird soaring through the air, and you want to share fifty-fifty in the fun, you probably won't be able to understand why your father, or your mother, or both, are so dead set against your having a gun.

Now, my purpose in writing this chapter is to make you see what shooting means from their point of view, and to try to make your folks see what it means to you as you and I see it.

Shooting as Some Folks See It.—In the first place, most men and women are afraid of a gun. To them a gun means only a deadly weapon which if it does not kill the person who handles it, or some one else, will of a surety maim them for life, and hence it is easy to see why they wouldn't think

of having a firearm about the house, much less of letting the boy have one of his own to play with.

Next to the fear of what might happen should a gun fall into the hands of a boy many persons believe—and I am one of them—that no living bird or beast, if it is harmless and not needed for food, should be killed. As many boys who live in small towns go around peppering the birds and cats and other living things on wing and foot, to say nothing of insulators on telegraph poles and weather-cocks on barns, the idea of a boy having a gun is in consequence very often tabooed.

Again, at this time many parents see a deeper and graver meaning in letting the boy use a gun, for they are not at all in favor of *preparedness,* which means that every boy and every man in this country should be given a military training the chief feature of which is to know how to shoot straight. And according to their code men should not shoot down their fellow-men, and they think right.

The proper way, they hold, is for nations to settle their differences not by war but by *arbitration*—that is, by having persons whom they select to meet and discuss the points at issue and so settle the dispute peaceably; and with this lofty ideal I am also in sympathy. It is clear that parents who are

opposed to preparedness are not apt to let the boy have a gun if they can help it.

Shooting as the Boy Sees It.—As a boy you look at shooting in quite another light. You can't just understand how it is that the boy next door to you can handle a gun and not do any damage with it and yet you are not allowed to have one. It isn't fair.

Of course you know just as well as your father and mother that if the blamed thing did go off of its own accord it would be apt to hurt somebody or other, or that if you pointed a gun that wasn't loaded at some one and for the fun of it just pulled the trigger it would mean almost certain death.

But you are as careful a boy as they make 'em and besides you've got too much sense to do anything foolish with a gun, and while some folks may not believe you after what I've said about *Gun Safety First* over there in the middle of the book I'd take you at your word and give you a try-out anyway. The result is that you think your folks are old fogies who have forgotten they were ever *kids;* but this isn't the kind of a spirit a boy of your caliber should show toward those who love you simply because they don't understand you, or, better say, because you don't know what they are thinking of down deep in their hearts.

And you are mum on the subject of birds and cats and things, for the reason that you haven't even thought of them yourself—you must have something in your hands that you can pump a piece of lead for 50 or 100 yards with first and a bird on a telegraph wire or a cat on a high back fence before the idea of its possibilities strike you; now, if you are a little more savage than civilized, why, you will simply blaze away, that's all, and all you're sorry about is that all the bears and Indians had been killed off before you arrived in the country.

As to this preparedness thing the papers are filled with, you don't care a hang about it one way or the other—all you want is to get a gun in your hands and have the sport of shooting it. And the question is how to get a rifle if there is opposition in your family, or how to get it the quickest way if there isn't any opposition.

This is about the situation as it stands now between parents who do not want the boy to shoot and the boy who wants to shoot whether they'll let him or no.

My Idea of Shooting.—I have seen a Pima Indian put a bow and arrow into a baby boy's hands who was not more than three years old and, with a patience born of having nothing else to do, teach

the little redskin how to draw the bow, aim the arrow and shoot.

And I have seen the men folks of the white race, both backwoodsmen and city dwellers, put a gun into the hands of a boy scarcely large enough to hold it and show him how to shoot, tell him what he could do and what he must not do with it and I have had occasion to observe that the man and his boy in such cases became the closest kind of *pals,* for the father had confidence in his son obeying his instructions, and sensing this confidence the son did his level best to do exactly as he was told.

Where such happy conditions exist I can render no useful service, but as I have said before I am writing this book for the boy who has no older head to guide him, and if you are that boy and can get a gun I want you to do just as I have told you all along from the first to the last chapter, for I am your friend and I believe in you.

Now, don't ever lose sight of the fact that a gun is dangerous if it is not handled rightly, and that it is quite safe if you know how to use it. In this respect it is like lots of other things that we make use of in our daily lives and think nothing about.

Take matches, for instance. Dangerous? No small-bore arm has ever been made that could compete with a match as a real source of danger. A

lighted match carelessly thrown away before it was put out has burned down many a house and burned up lots of people, but grown-up folks do not say to a boy of twelve, "Don't ever take a match, much less light one."

How is it, you may wonder, if matches are as dangerous as guns that people are not afraid of them? And the answer is because they are acquainted with them and they know by long experience that if they use them in a certain way they are safe enough. So in every home you will find enough safety matches to set the whole town on fire.

Since it is possible to teach a boy how to use a match safely, why not also teach him, or let him be taught, how to use a gun safely? We are always afraid of that which we know nothing about, and while it is just as well that this is so as long as we won't learn, the best way to get rid of fear is to learn all about the thing we are afraid of.

The reason a boy shoots at objects he should not shoot at is because he is not provided with the right kind of targets. Give him a fixed target at 25 yards with a bullseye 1 inch in diameter and a bell back of it so that it will ring out when he hits it and he won't care much about a tomcat over yonder that looms up as big as a barn door.

Or better, give him a hand trap that will throw a clay pigeon through the air so swiftly that it will make a wild duck look sick and he will have but little temptation to take a pot shot at the first object that comes into sight. Best of all let him belong to a rifle or trap-shooting club where competitions are held and loose shooting will make no appeal to him.

As to preparedness, my idea is this: At the present time we are all of us living in a transition period of the world's history and as a result we have a civilization that seems to be all right, at least the crust is nice and brown; but all you have to do is to cut off a slice and you will find the inside of it only dough—half-baked—and this accounts for the wide differences between those who cry for war and others who want peace at any price.

Before the great European conflict the nations vied with each other if not in culture then in boasting as to which one had the most culture. Art, science and philosophy had reached the highest pinnacle yet attained in the world's history, and although all of the nations had men resting on their arms, to the ordinary person at least it seemed that in virtue of a civilization as far advanced as ours, and when it was to the advantage of every coun-

try to be on friendly terms with every other country, that war on a large scale was simply out of the question.

But in a night war came and, strangely enough, by the very advancement in knowledge that made a high state of refinement and progress possible it also provided the means for staging the most stupendous, barbaric war that has ever been waged. Gigantic guns, huge automobiles, the submarine, the flying machine and hundreds of lesser devices have been called into service, but as effective as they are, the man with the small-bore gun is just as important to his country as he was in any war ever fought in the past.

Germany's early successes were due to the fact that she was prepared and because of the laxity of preparedness on the part of the Allies; and these two factors are accountable for the latter's early defeats. In the two years that the war has been going on the Allies have prepared and they are winning now since their resources are greater, and this gives them the balance of power.

The effect of being prepared and the lack of it has made a deep impression on the people of the United States, and hence the discussions in the newspapers pro and con as to the value of military instruction in schools. Some educators are in

favor of it and others are just as strongly opposed to it, but this much is certain—if you are going to have a country you must be prepared to stand up for your country.

In this respect countries are just like boys. Just as soon as other boys find that you will not fight for your rights there will be one or more among them that will commence to bullyrag you, but once show them that you have the courage to fight, especially if you have the punch to back it up with, and you will never be molested again except for cause.

And this is just as true of your country. If a country is to remain a country she must be prepared to defend her rights; and not only to fight for them but to fight hard. If the colonists had not been courageous enough to fight for what they knew was right and had they not, each and every one of them, been sharpshooters, this great land of the free and home of the brave would still be paying taxes on tea as well as on several other things to Great Britain. And for these reasons and some that I have not mentioned we must have war if needs be.

That war is all wrong everybody with a grain of intelligence will admit, but this is not the fault of civilization but because civilization is hardly out

of its short pants, and so every now and then it reverts back into savagery. This being the case, the only thing to do is to meet conditions as we find them.

However much you may hate war and preach against it from your steam-heated, electric-lighted and velvet-carpeted library if you were suddenly set back in time when you were a cave-boy again, you wouldn't care much about the ethics of preparedness but what you would do is to grasp a club —or a .44-caliber repeating rifle would be better— and sally forth to do battle with the wild beasts and wilder men in the effort to get some food and save your life.

And you have to do the same thing now even as you did away back there when the human race was young and you and I had left our tree homes and went to live in cave homes, for it is just as much a matter of self-preservation and the survival of the fittest today as it was then, only we are not put up against it so often and this makes it seem all the harder when it comes. The code of civilization says, "Thou shalt not fight," but the code of Nature says, "Thou must fight for thy rights," and Nature is older than civilization.

That fighting is foolish in our age is patent to every thinking person and it seems doubly so to the

onlooker, especially if he is of a peaceful turn of mind and is a writer safely tucked away in some sleeping little village like myself, and the fight is on in far-off Europe. But if he caught some sneaking thief taking his chickens from the roost would he say, "Brother, these fowls are just as much yours as they are mine, so help yourself!" and go quietly back to bed? Rather the chances are that, however much he loved peace and his fellow-man, if he had a sawed-off double-barreled shotgun loaded with No. 8 shot he'd let go and say something else.

This great United States is *your* country and you love it because it is *your* country. And the reason it is yours is because the boys of '76 and again the Northern boys of '61 fought for it and I can't see how any one could have the unadulterated nerve to call it *his* country just because he was born here if he wouldn't fight for it and die for it if needs be.

Yes, if you are going to have a country you must be prepared to fight for it to the last trench and the best way to be prepared is to learn how to shoot and to shoot straight, and then should a real call ever come when your country needs you, as it came to the boys of France and England, you can shoulder arms like a veteran, salute the flag and say, *"I am prepared."*

Military Training in Schools.—To learn to shoot is only one part of a boy's military training. Many writers believe that every boy of twelve years of age and over should be given military training, that is, he should be trained not only to shoot but to drill in the manual of arms and to be disciplined to stand the hardship of the trenches.

My opinion is that military training in schools is not at all needed, and to many boys it is extremely distasteful. If the schools provide the sports of to-day, such as football, baseball and gymnastics, to develop the muscles of the boy and his powers of endurance he will be as well fitted for actual service in the field as any course of military training in a secondary school can give him.

Let the boy's exercise be of the sort that boys like, and do not try to force him to do a man's work while he is yet a boy. Let him learn to shoot as a matter of sport and let him enjoy life to the fullest while he is a boy, and then should a crisis appear in which his country's honor and existence are at stake, he will be on the firing-line and he will serve his country well.

Preparedness in Public Schools.—A fine example of preparing the boy for his own mental and physical welfare, and at the same time preparing him to defend his country should he ever be called

on to do so, is the work that is now being carried on by the Public Schools Athletic League of the City of New York under the direction of its Secretary, Dr. C. Ward Crampton.

The chief purpose of the League is to look after the bodily welfare of the boy and to build him up so that he is healthy and strong and fit, and experience has shown that this can be done to the best advantage by means of competitive games.

Calisthenics—that is, light gymnastic exercises of an improved kind—are used to develop the boy's mental activities and these are further sharpened by teaching him to shoot with a sub-target machine. When the boy has shown himself to be a good shot he can then use the rifle ranges in the armories, where General Wood of the U. S. Army has assigned sergeant instructors to meet the schoolboy squads and to give them instruction in real rifle shooting.

Every school, where it is practicable, should take up the matter of training boys along the lines indicated above, both for the good it will do the boy and the possible good it may do the country.

CHAPTER XII

USEFUL INFORMATION

Shooting Rules for Rifle Clubs.—*Special By-laws:* 1. Members must submit to the orders and directions of the Range Officer on duty.

2. All ammunition used on the Club Range must be bought from the Club.

3. Members may only shoot at the target which the Range Officer on duty has previously allotted to them.

4. Subject to target being available the Range Officer may allow to each member two targets at one time, of which one may be used for sighting shots and the other for record.

5. No member may occupy a place on the firing point for more than 15 minutes when others are waiting.

6. No member may go in front of the firing point on any pretense whatever.

7. On the words "*Cease fire!*" members must unload their rifles and lay them on the firing point and leave them there until the word "*Fire!*"

8. No member may load a rifle anywhere but on the firing point.

9. No member may point a loaded or an unloaded rifle anywhere but on the firing point and in any direction other than the butts. Suspension and a fine of $1.00 is the penalty for the first offense and dismissal from the Club for the second offense.

10. No member may fire at any longer distance until he can place all of his shots on the target at the next shorter distance.

11. No firearm using other than .22 ammunition may be used on the Range.

12. Competitors must load from a wood block holding 10 cartridges.

Competitions.—13. Except where otherwise specified in the conditions all competitors are on a handicap footing.

14. In all unlimited entry competitions all handicaps are reduced 50 per cent.

15. No target will be counted for any competition unless, prior to shooting, a competition ticket has been purchased and handed to the Range Officer.

16. Members must use Club rifles in turn, and when others are waiting no member may retain a Club rifle for more than 15 minutes.

17. Any member negligently or willfully dam-

aging any rifle, telescope or other property of the Club shall have to make good the damage.

Rifles and Ammunition.—18. Any single-loading or repeating rifle not larger than .22 caliber, with any sight not containing glass which may be attached to any part of the rifle and with trigger pull of not more than 3 pounds may be used.

19. The Range Officer may disallow the use of any rifle which in his opinion is defective or likely to prove dangerous.

20. Any ammunition not larger in caliber nor greater in muzzle energy than that of the .22 rimfire long rifle cartridge may be used.

21. A sling strap may be used.

Position.—22. Except when otherwise specified in the conditions of the competition shooting may be in any position, standing, kneeling, sitting, prone or back position at the option of the members, provided, however, that the forearm supporting the rifle shall be free from any support from elbow to rifle, and that no artificial rest for the rifle of any kind be permitted.

Targets.—23. Targets may be of three kinds and these are (*a*) bullseye, 25 yards, 50 yards and 100 yards (see Appendix B); (*b*) man target (see Appendix B), and (*c*) clay disks 2 inches in diameter.

Shooting.—24. Shooting at bullseye targets will be a string of 10 shots with a time-limit of 10 minutes.

25. Shooting at man targets will be in strings of 10 shots with a time-limit of 2 minutes from the word "*Fire!*" Scoring will be the same as for bullseye targets.

26. A team shooting at the man targets will be at 50 yards by teams of 4 to 6 men for one minute from the word "*Fire!*", during which the shooter may fire as many shots as he is able.

27. Shooting at clay disk targets will be by a team of 4 or 5 at 100 yards. Two sets of 5 or more disks will be placed on the butt with not less than 1 foot of space between each disk and 6 feet between each set of disks and two teams will lie down together. Shooting will be opened on the word "*Fire!*" and kept up until one team has broken all its disks. The team which does this first is the winner.

Scoring.—28. The value of a hit will be determined by the edge of the shot hole nearest to the center of the target.

29. If a shot hole is not clearly defined its value may be determined by the use of a *plug gauge* .22 inch in diameter.

30. When a target has more hits than the specified number of shots in the competition hits its excess shall be deducted from those of the highest value, but

31. When a target has less than the specified number the competitor shall be deemed to have missed.

32. Scores shall be counted and recorded by a Range Officer appointed for that purpose and any score may be challenged upon payment of 25 cents, which will be returned if the challenge is upheld. All challenges will be decided by the Committee, whose decisions are final.

33. Under no circumstances may a competitor touch his own or the target of another competitor until the score has been recorded. No challenge is permitted in respect of a target which has been so touched, and the penalty for breach of this rule is the disallowance of the entire score on the target touched.

Ties.—34. In individual competitions for prizes in kind and in any competitions specified by the Committee, ties will be decided by refiring the specified string at the longest range included in the competition with such time-limit or proposition thereof as was required by the conditions of the competition.

Subject to this rule ties will be decided as follows:

35. In individual and team competition for prizes:

(*a*) If at more than one distance by the highest score at the longest distance; (*b*) if still a tie by the fewest hits of the lowest value, and (*c*) if still a tie by shooting off at the longest distance.

In handicap competitions subject to Rule 35 ties will be decided in favor of the competitor receiving the smallest handicap and if still a tie by the application of Rule 34.

Hitting the Wrong Target.—36. A competitor hitting the wrong target shall lose the hit.

37. Any competitor deliberately firing at another competitor's target shall be disqualified and further subject to such penalties, including dismissal from the Club, as the Committee may decide.

Misconduct.—38. Any member guilty of any dangerous, dishonest or discreditable conduct may be at once suspended from all the rights and privileges of the Club by the Range Officer and will be further subject to such penalties including dismissal from the Club, as the Committee may decide.

Spotting.—39. In individual competitions at

bullseye targets the competitors may use a telescope.

40. In individual competitions at man targets spotting is not allowed.

41. In team competitions one spotter, or coach, per team, who may use a telescope, is allowed.

Defective Rifles and Ammunition.—42. In cases of defective cartridges where the bullet does not leave the barrel another cartridge may, with the permission of the Range Officer, be used, but no other defect will be recognized.

43. In competitions with a time-limit no extra time will be allowed in case of *misfires,* but the competitor may fire another shot if he is able to within the time.

44. Should a rifle break, jam or otherwise become defective, the Range Officer may permit the competitor to shoot with another rifle, but no extra time will be allowed.

Dimensions of Man Targets.—A man target is a flat surface cut out to represent the head and shoulders of a man but so reduced in size that it appears to be a man at a distance of 500 yards away.

Dimensions of Bullseye Targets.—For the above contests bullseye targets will be printed on white cardboard with scoring rings of the following dimensions:

Scoring Points	25 yds.	50 yds.	100 yds.	Remarks
	diameter	diameter	diameter	
10	0.5 inch.	1 inch.	2 inch.	Colored black to form bullseye.
9	1 "	2 "	4 "	
				Note
8	1.5 "	3 "	6 "	Targets will be 6 inches square for 25 and 50 yd. and 12 inches square for 100 yd. shooting and only so many rings as can be included in these dimensions respectively will be printed.
7	2 "	4 "	8 "	
6	2.5 "	5 "	10 "	
5	3 "	6 "	12 "	
4	3.5 "	7 "	14 "	
3	4 "	8 "	16 "	
2	4.5 "	9 "	18 "	
1	5 "	10 "	20 "	

The National Rifle Association.—The rules governing rifle shooting as adopted by the National Rifle Association, as well as other valuable information relating to the use of the nearest ranges belonging to the regular army, national guard or rifle club and the qualification for boys under 18 years of age to membership can be had by addressing Major Fred H. Phillips, Jr., Washington, D. C.

The Association for the Encouragement of Trap-shooting.—The rules governing trap-shooting and information concerning membership in the above association can be obtained by addressing the Secretary of the above association, Mr. E. Reed Shaner, 219 Coltart Ave., Pittsburgh, Pa.

APPENDICES

APPENDIX A

Lyman Time System of Rifle Shooting.—For shooting under this system only rifles using the following cartridges will be permitted: .22-short; .22-long; .22-long rifle; .22 Winchester automatic; .22 Winchester rim-fire; .32-short; .32-long, and .32-long rifle.

Targets.—25 yards: Lyman's target No. 1; 50 yards: Lyman's target No. 2, and 100 yards: Lyman's target No. 3.

Shots.—Ten.

Time-limit.—20 seconds.

Scoring.—For any shots that are fired within the time-limit that do not score on the target, the shooter forfeits 5 points.

The following points to be added to the target score:

10	shots	in	20	seconds	.....	time-limit.	
10	"	"	19	"	.....	2	points
10	"	"	18	"	.....	4	"
10	"	"	17	"	.....	8	"
10	"	"	16	"	.....	12	"
10	"	"	15	"	.....	14	"
10	"	"	14	"	.....	20	"
10	"	"	13	"	.....	25	"
10	"	"	12	"	.....	30	"
10	"	"	11	"	.....	35	"
10	"	"	10	"	.....	40	"

APPENDIX B

Targets for Rifle Practice.—A large number of different kinds of targets have been used by American riflemen during the past fifty years, and the following are a few of them:

The *Creedmore* target with a square bullseye was adopted by the National Rifle Association in 1871, when it was called the National Rifle Association Target.

The *Hinman* target was designed by Major Hinman in 1885, and it was adopted by most of the American rifle clubs in the United States in 1886. It is now called the Standard American Target.

The *Standard American* target is used for pistol, revolver and rifle shooting. The dimensions of this target for 200-yard rifle shooting are:

Diameter of Circles

10-inch	circle,	3.36	inches	5-inch	circle,	19.68	inches
9 "	"	5.54	"	4 "	"	26	"
8 "	"	8	"	3 "	"	34.22	"
7 "	"	11	"	2 "	"	46	"
6 "	"	14.80	"	1 "	"	balance of target, 4 x 6 feet.	

Width of Rings

9.....	1.09 inches	5.....	2.44 inches
8.....	1.23 "	4.....	3.16 "
7.....	1.50 "	3.....	4.11 "
6.....	1.90 "	2.....	5.89 "

The *National Rifle Association* target was adopted by the National Rifle Association of America in 1901. There are three classes of targets, and these are: (1) first class; (2) second class, and (3) third class.

The *first-class* target is 6 x 12 feet square and the range is 800, 900 and 1,000 yards. The bullseye is 3 feet in diameter; the center 4½ feet in diameter; the inner space is 6 feet square and the outer space is the balance of the target.

The *second-class* target is 6 x 6 feet square, and the range is 500 to 600 yards. It has a bullseye 22 inches in diameter, center 38 inches, inner 54 inches in diameter and the outer the balance of the target.

The *third-class* target is 4 x 6 feet square, and the range is 200 to 300 yards. The bullseye is 8 inches in diameter, the center is 26 inches, the inner is 46 inches in diameter and the outer is the balance of the target.

The *count* on these targets is: bullseye 5; center 4; inner 3, and outer 2. Ricochet shots—that is, glancing shots—will be scored as misses except in skirmish and volley matches.

The *United States Army* uses what is called *silhouette* or *figure* targets entirely and these consist of figures of men standing, kneeling and lying down as well as figures mounted on horseback and groups of mounted and unmounted figures, complete details of which will be found in the United States Army Regulations for Small Arms Firing and which can be obtained from the War Department, Washington, D. C.

Indoor rifle targets are made in many shapes and designs, but as they are used at varying distances there are no standard rules which would apply to them.

APPENDIX C

Telescopic Rifle Sights.—A telescope, or *telescopic sight*, as it is called, is sometimes used for the sight of a rifle with the object of aiding poor sight and of increasing good sight of the shooter. Telescopic sights are rated by their

magnifying *power* and hence they are called *high power* and *low power*, and these sights can be had from one power up.

As it is quite impossible to hold a rifle still when shooting without a rest every movement of the telescope which is fixed to the barrel of the gun is magnified and this is often very confusing to the shooter. For this reason low-power telescopes should be for offhand shooting and high-power telescopes are better for shooting with a rest. For offhand shooting telescopes of from 4 to 10 power will be found high enough, but for rest shooting 10 to 20 power can be used to advantage.

APPENDIX D

How to Find the Twist of Rifling.—Grease the inside of the barrel of your rifle good and plenty. Get a piece of straight wire that is smaller than the bore of the rifle and drill a hole in a bullet, which should be large enough to fit snugly into the bore in order to get the full impression of the rifling, and fasten one end of the wire to it.

Now push the bullet by means of the wire from the muzzle to the point where the rifling starts at the chamber. Fix the barrel in a vise and make a chalk mark on the breech and muzzle of the barrel and also make a mark on the wire in a line with those on the barrel. Make a mark on the wire even with the muzzle and force the bullet toward the muzzle.

When the chalk mark on the wire has turned once around and it is again in line with those on the barrel measure the number of inches the mark on the wire has traveled from the muzzle of the barrel and you will have the twist of the rifling. The rifling of a barrel is from 2 to 5 thousandths of an inch deep.

APPENDIX E

Twist of Rifling in Barrels of Various .22-Caliber Rifles.—

Remington Rifles.—

.22 Short	one turn in	24	inches
.22 Long and Extra Long Rim-fire	"	"	"	20	"
.22 Long Rifle Rim-fire	"	"	"	16	"
.22 13-45 W. C. F.	"	"	"	16	"

Winchester Rifles.—

.22 13-45 C. F.	one turn in	16	inches
.22 Short and Long R. F., Model '90, and .22 Long S. S.	"	"	"	20	"
.22 Short, Single-shot	"	"	"	24	"
.22 Long Rifle, S. S.	"	"	"	16	"
.22 Long Rifle, Model 1906	"	"	"	17	"
.22 W. R. F., Model '90	"	"	"	14	"

Savage Rifles.—

.22 S. H. P.	one turn in	12	inches

Marlin Rifles.—

.22 Rim-fire Ballard	one turn in	20	inches
.22 Rim-fire Magazine	"	"	"	16	"

Stevens Rifles.—

.22 Short Rim-fire	one turn in	25	inches
.22 Long Rifle Rim-fire	"	"	"	16	"
.22 15-60	"	"	"	12	"

APPENDIX F

What the Caliber of a Rifle Means.—The caliber of a rifle or a revolver is the gauge of its bore and it is measured by the hundredths of an inch. Take, for instance, a .22-caliber rifle; this means that the bore is $\frac{22}{100}$ of an inch in diameter, but instead of using a common fraction to

express it a decimal fraction is used, when, of course, it becomes simply .22. In the same way .32-caliber means that the bore is $\frac{32}{100}$ inch. If the caliber of a rifle was .25 then its bore would be $\frac{25}{100}$ or ¼ inch.

APPENDIX G

What the Gauge of a Shotgun Means.—The gauge of a shotgun is measured in a very different way from that of a rifle. The reason is that the bore of a rifle is measured by the up-to-date decimal system while a shotgun is still measured by a very ancient and arbitrary scheme.

That is, in days of old when knights were bold and bullets held their sway, the only kind of bullets used were round and the gauge of a gun was known according to the number of shot or bullets that there was in a pound. As an illustration, if the barrel of a gun was bored to use a ball and it took 25 of these balls to weigh a pound, it was called a 25-gauge gun.

The following table gives the gauge of the different bores of standard shotguns and also the exact diameter of each gauge in thousandths of an inch:

Gauge or Bore	Diameter of Bore in Decimals
8	.835
10	.775
12	.729
14	.693
16	.662
20	.615
25	.571
30	.637
32	.526
40	.488
50	.453